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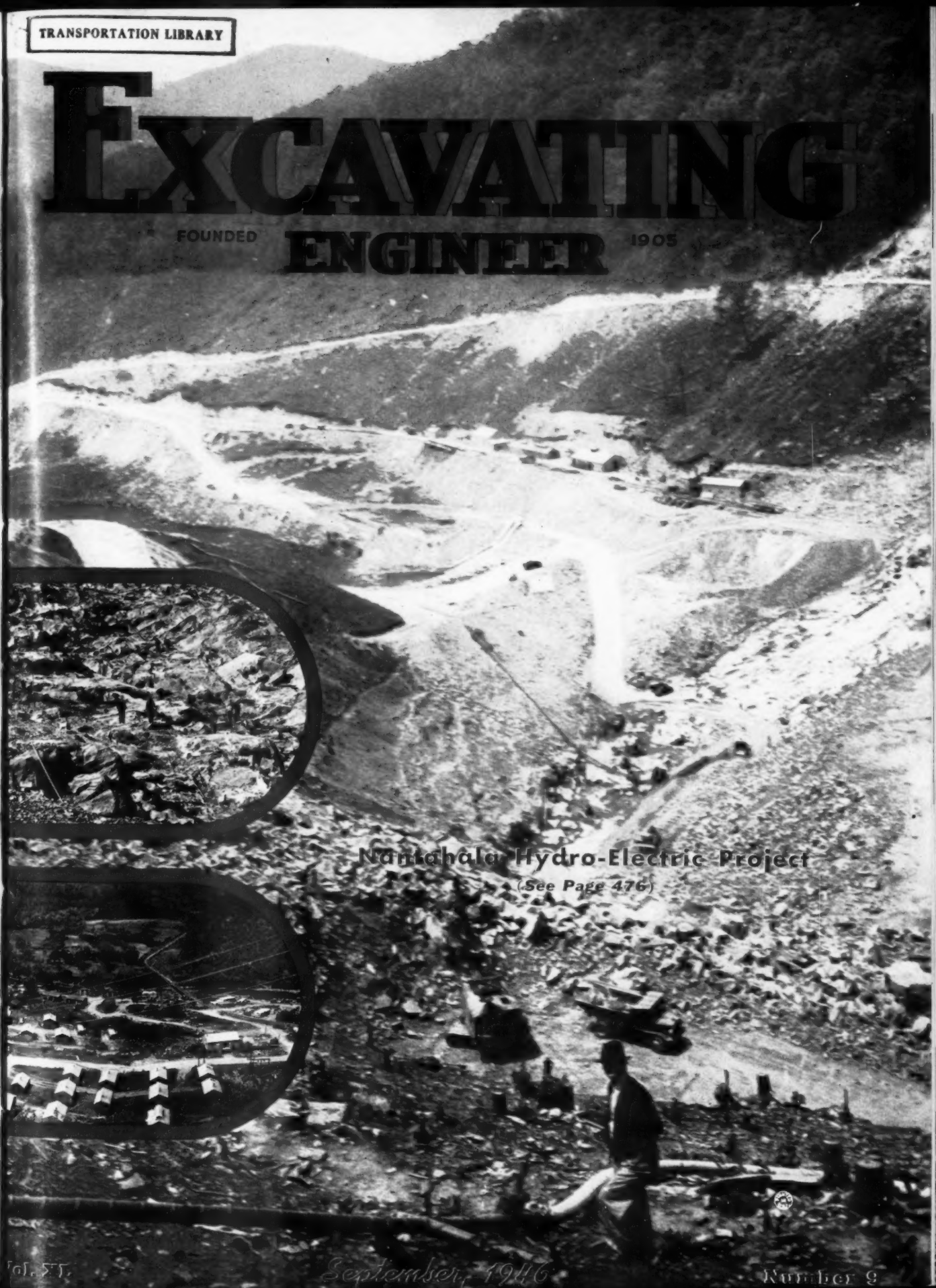


Nantahala Hydro-Electric Project

(See Page 476)

Vol. 37 September, 1946 Number 9

WHAT'S LOW IN DRILLING COSTS?

Let Bucyrus-Erie Drills Show You!

Until you've investigated the economies that Bucyrus-Erie blast hole drills are giving owners everywhere, you can't appreciate the preparation savings possible on your operations. That's why it will pay you to watch Bucyrus-Eries in action — to see for yourself what's really low in drilling costs. Here are some of the things to look into:

Footage Drilled per Shift

The Bucyrus-Erie drilling motion, plus a derrick-head rubber shock absorber which imparts resiliency to wire line, concentrates the power of the drilling blow where it counts the most — at the bottom of the hole.

Maintenance Requirements

All-steel electric-welded construction keeps machinery enduringly aligned in the frame, resists the stresses encountered in long use. The shock absorber and rubber-insulated spudding beam and heel sheaves protect machinery from shock. All are factors which help cut maintenance to the bone.

Actual Drilling Time Each Shift

Caterpillar-type mountings provide fast sure moves; built-in jacks permit quick leveling; built-in tool wrenches (available on all except the 22-T) speed tool changes. Time savings here mean more time for drilling.

Operating Costs

Compact arrangement, efficient power flow, and careful workmanship result in smooth-running machinery that's easy on fuel.

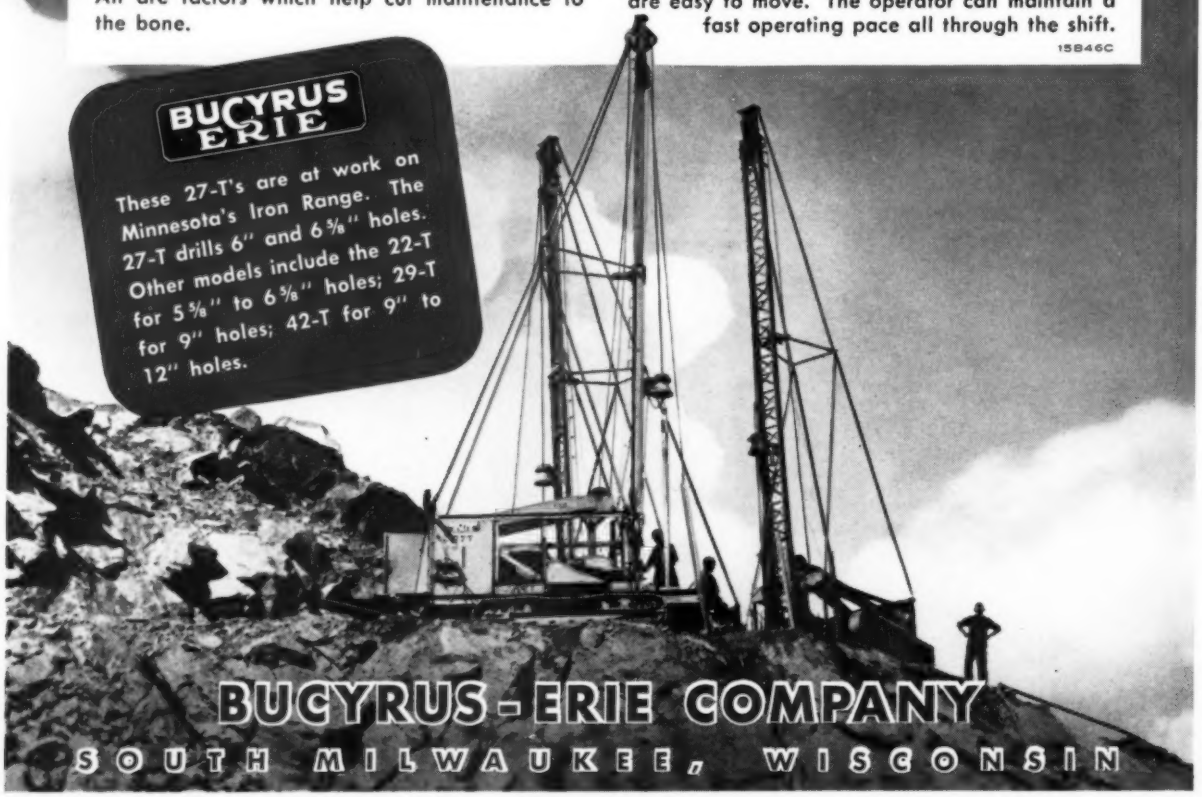
Operating Ease

Both operating and propelling levers are grouped within easy reach of the operator when he stands at his drilling or propelling position. All levers are easy to move. The operator can maintain a fast operating pace all through the shift.

15846C

BUCYRUS ERIE

These 27-T's are at work on Minnesota's Iron Range. The 27-T drills 6" and 6⅝" holes. Other models include the 22-T for 5⅝" to 6⅝" holes; 29-T for 9" holes; 42-T for 9" to 12" holes.



BUCYRUS-ERIE COMPANY

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MEET THE J-50

THE NEW 55-POUND "JACKHAMER"

- NEW three-in-one backhead. (Wet, dry, or blower)
- NEW graduated throttle valve
- NEW "fighting-heart" valve
- NEW positive hole-cleaning
- NEW matchless drilling speed
- NEW ease of operation

Frontheads available for all standard drill steel sections.

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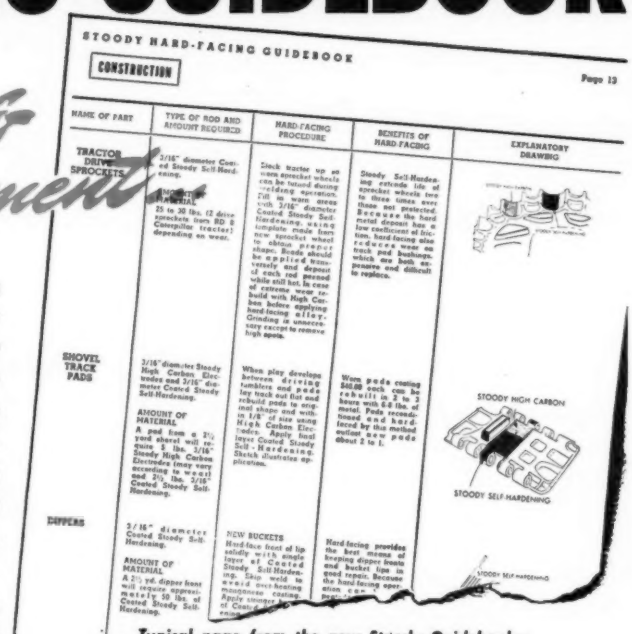
FREE! NEW STOODY HARD-FACING GUIDEBOOK

For all users of Earth Working & Processing Equipment

EVERY WELDER, every foreman and superintendent in *any* plant using earth working or processing equipment needs this new Stoody Hard-Facing Guidebook! It tells at a glance (1) where and how to apply Stoody Hard-Facing alloys to get the greatest increase in life (2) the correct alloy to use for maximum benefits, (3) the average material requirements and (4) expected life increase of parts.

Contains illustrations and information on all types of industries where wear takes its toll in equipment life. Covers CONSTRUCTION, COAL MINING, METAL MINING, ROCK PRODUCTS, CEMENT, BRICK AND CLAY, DREDGING, etc. Clearly illustrates each piece of equipment, areas to be built up and zones requiring extra protection afforded by Stoody alloys.

Even though you're getting satisfactory results with your present hard-facing method, a change of alloy or a different application procedure may effect a worthwhile improvement! Why not know the right alloy to use, the vital zone to hard-face and the correct welding procedure? Remember, there's no guess-work when you use the new Stoody Hard-Facing Guidebook, for all methods given are the choice of actual field applications developed by welders and foremen!


STOODY HARD-FACING GUIDEBOOK

CONSTRUCTION

Page 13

NAME OF PART	TYPE OF ROD AND AMOUNT REQUIRED	HARD-FACING PROCEDURE	BENEFITS OF HARD-FACING	EXPLANATORY DRAWING
TRACTOR DRIVE SPROCKETS	5/16" diameter Coated Stoody Self-Hardening. AMOUNT OF MATERIAL 25 to 30 lbs. (2 drive sprockets (use RD 6 Caterpillar tractor) depending on wear.	Stock tractor up at once sprocket wheels can be turned during welding operation. Fill in worn areas with 5/16" diameter Coated Stoody Self-Hardening, using complete made from new sprocket wheel to obtain pin proper shape. Beads should be applied transversely and deposit of each rod pressed while still hot. In case of extreme wear rebuild with High Carbon before applying hard-facing alloy. Grinding is unnecessary except to remove high spots.	Stoody Self-Hardening extends life of sprocket wheels two to three times over those not protected. Because the hard-facing deposit has a low coefficient of friction, hard-facing also reduces wear on track pad bushings, which are both expensive and difficult to replace.	
SHOVEL TRACK PADS	3/16" diameter Stoody High Carbon Electrodes and 5/16" diameter Coated Stoody Self-Hardening. AMOUNT OF MATERIAL A pad from a 2½ yard shovel will require 3 lbs. 3/16" Stoody High Carbon Electrodes (may vary according to wear) and 2½ lbs. 5/16" Coated Stoody Self-Hardening.	When play develops between driving tumblers and pads lay track out flat and rebuild pads to original shape and width in 1/8" of size using High Carbon Electrodes. Apply final layer Coated Stoody Self-Hardening. Sketch illustrates application.	Worn pads costing $60.00 each can be rebuilt in 2 to 3 hours with $4.6 lbs. of metal. Pads reconditioned and hard-faced by this method outlast new pads about 2 to 1.	STOODY HIGH CARBON STOODY SELF-HARDENING
DIPPERS	5/16" diameter Coated Stoody Self-Hardening. AMOUNT OF MATERIAL A 2½ yd. dipper bowl will require approximately 50 lbs. of Coated Stoody Self-Hardening.	NEW BUCKETS Hard-face front of lip solidly with single layer of Coated Stoody Self-Hardening. Skip weld to avoid overheating manganese casting. Apply single layer of Coated Stoody Self-Hardening.	Hard-facing provides the best means of keeping dipper bowls and bucket lips in good repair. Because the hard-facing operation can	STOODY SELF-HARDENING

Typical page from the new Stoody Guidebook—it's simple, legible, concise . . . yet complete! Pages illustrate all commonly used equipment in a wide variety of industries.

Best of all, the new Stoody Hard-Facing Guidebook is free! Simply return the attached coupon, or send your name, Company title, and address on your letterhead. The Stoody Guidebook will be *rushed* to you without obligation. Write to-day!

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STOODY HARD-FACING ALLOYS
Retard Wear — Save Repair

EXCAVATING ENGINEER

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CONTENTS

Vol. XL **September 1946** No. 9

September Advertisers

American Cable Division, American Chain & Cable Company, Inc. .....3rd Cover
American Steel & Wire Co... 473
American Steel Dredge Co., Inc. 498
Bethlehem Steel Co. 468
Barber-Greene Company 517
Blaw-Knox Company 525
Bucyrus-Erie Company...2nd Cover 470-471, 491, 518
Caterpillar Tractor Co. 513
Colorado Fuel & Iron Corporation, The Wickwire Spencer Steel Div. 506
Columbia Steel Co. 473
Cooper-Bessemer Corp., The 4th Cover
Detroit Diesel Engine Div., General Motors Co. 472
Donaldson Company, Inc..... 510
Erie Steel Construction Co. .. 516
Euclid Road Machinery Co., The 507
For Sale (Classified) 527-528
Gar Wood Industries, Inc, Hoist and Body Div. 493
Gar Wood Industries, Inc..... Road Machinery Division... 503
Gatke Corporation 502
General Electric Company ... 515
General Excavator Co., The .. 474
General Motors Corp.—Detroit Diesel Engine Div. 472
General Tire & Rubber Co., The 509
Haiss Manufacturing Co., Inc., George 494
Harnischfeger Corporation ... 514
Hayward Company, The..... 514
Hercules Powder Company ... 519
Hodgman Rubber Co. 467
Ingersoll-Rand Co. 465
International Harvester Company 496-497
Johnson Co., C. S., The..... 500
Koehring Company 504-505
Leschen & Sons Rope Co., A... 523
LeTourneau, Inc., R. G. .. 520-521
Macwhyte Company 499
M-R-S Manufacturing Co..492-493
Northwest Engineering Co..... 469
Onan & Sons, D. W..... 516
Osgood Company, The..... 474
Owen Bucket Company, The.. 522
Rodgers Hydraulic, Inc..... 475
Rogers Brothers Corporation.. 512
Sauerman Brothers, Inc..... 508
Stoody Company 466
Templeton-Kenly & Co. 512
Thermoid Company 501
United States Steel 473
Wellman Engineering Co., The 528
White Manufacturing Company 508
Wico Electric Company..... 511
Wickwire Spencer Steel Division, The, Colorado Fuel & Iron Corporation 506

Cover Picture
Cover Picture — General view of Nantahala dam showing road started across right bank. Top insert: Left slope impervious seal. Bottom insert: Camp No. 1 and equipment yard from water tank on road to Portal No. 1.

Job Engineer's Diary Nantahala Hydro-Electric Project (First of three parts) by Philip H. Kline 476
Starting one month after arrival of key men and opening of temporary offices on the site, this diary, with illustrations, carries through progressively to completion construction in North Carolina of a 60,000 h.p. hydro-electric project jor the Nantahala Power and Light Company, a subsidiary of the Aluminum Company of America.

Off-street Parking — By Bethune Jones.... 482
Cities giving increasing consideration to proposals for extensive underground or surface-building parking facilities to ease traffic congestion.

Reclaiming Land for Citrus..... 483

Creating Red Lake — By Blaine S. Britton.. 484

Field Notes 486
Wheel Guards 486
Practical Use for Worn Tires 486
Explosive Safety Practices 486
Easily Installed Deadman 486

Ex-Laffs 487

Equipment You Ought to Know About..... 488
Decimal Point Slide Rule 488
Maloney Boulder Buster 488
Crane Remote Control 488
New Pioneer Plant 488
Lightweight Conveyor 488
Precision Subgrader 488
Transparent Waterproofing 489
"Mobile" Arc Welder 489
Adjustable, Plastic T-Square 489
Gun-Loader Fitting 489
Manganese Dippers 489
Paving Breaker .. 489 Cushion Idler 489

Shots from the Firing Line..... 490
Reclamation Bureau Gets Record Appropriation 490
Award Two Contracts on Penn-Lincoln Parkway 494
Propose Super Toll Road to Run Through Ohio.. 494
Highway Prospects Brighter for 1946..... 498
Authorize U. S. Agencies to Build Bridges 500
Bashore U. S. Representative 500
White River Constructors Get Bull Shoals Dam Job 502
A.E.D. Regional Conferences Scheduled 502
Start Work on New York's New Super-highway.. 506
Relocate Highway from Boysen Reservoir Area.. 508
Let Contracts on 45 Miles of Canals..... 510
Award Contract on Road Relocation 510
Aggregates for Columbia to be Processed 511
Airports Increase Tenfold but Need Still Great.. 511
Place 360,000 Yds. in Month at Anderson Ranch 514
Kentucky County Road Program is Started.... 514
Utah Construction to Start on Angostura Dam 516
State Road Awards are $241,000,000 517
Interstate Route Accepted by 39 States to Date 517
Engineers Let $91,000,000 Contracts 518
Begin Work on Hungry Horse Dam in Montana 518
Contract Granted for Preparing Aggregates 522
Urge States Keep Federal Aid Spending Down.. 522
Twenty-Sixth Annual Meeting 523

Obituaries 523
Joseph H. Jackson .. Charles Scott Landers . 523

Not in the Contract..... 524

New Trade Literature..... 525

Notes from the Manufacturers..... 528

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467

"Tense? NOT ME!"

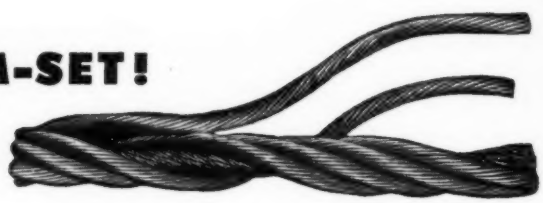
Maybe he doesn't know it, but he's taking the world's best medicine—relaxation. No locked-up stresses in *him*.

Tense? NOT FORM-SET!

A preformed rope is relaxed, too—relaxed internally, just like the man. But, in the case of the rope, that inner, relaxed effect is permanent. Preforming does it.

Bethlehem Form-Set (preformed) rope is remarkably free of internal stresses. In wire rope language, it is much less susceptible to bending fatigue.

A Form-Set rope is good-natured . . . easy to handle, easy to rig. And you'll find that it doesn't kink readily. Try it and see what *built-in relaxation* means to rope!



This is a cut section of Form-Set rope. The wires and strands cannot spring up by themselves; in this case, they have been lifted out by hand.

Even when cut or broken, the wires and strands of a Form-Set rope are relaxed, free of locked-in tension; lie smoothly and easily in place.

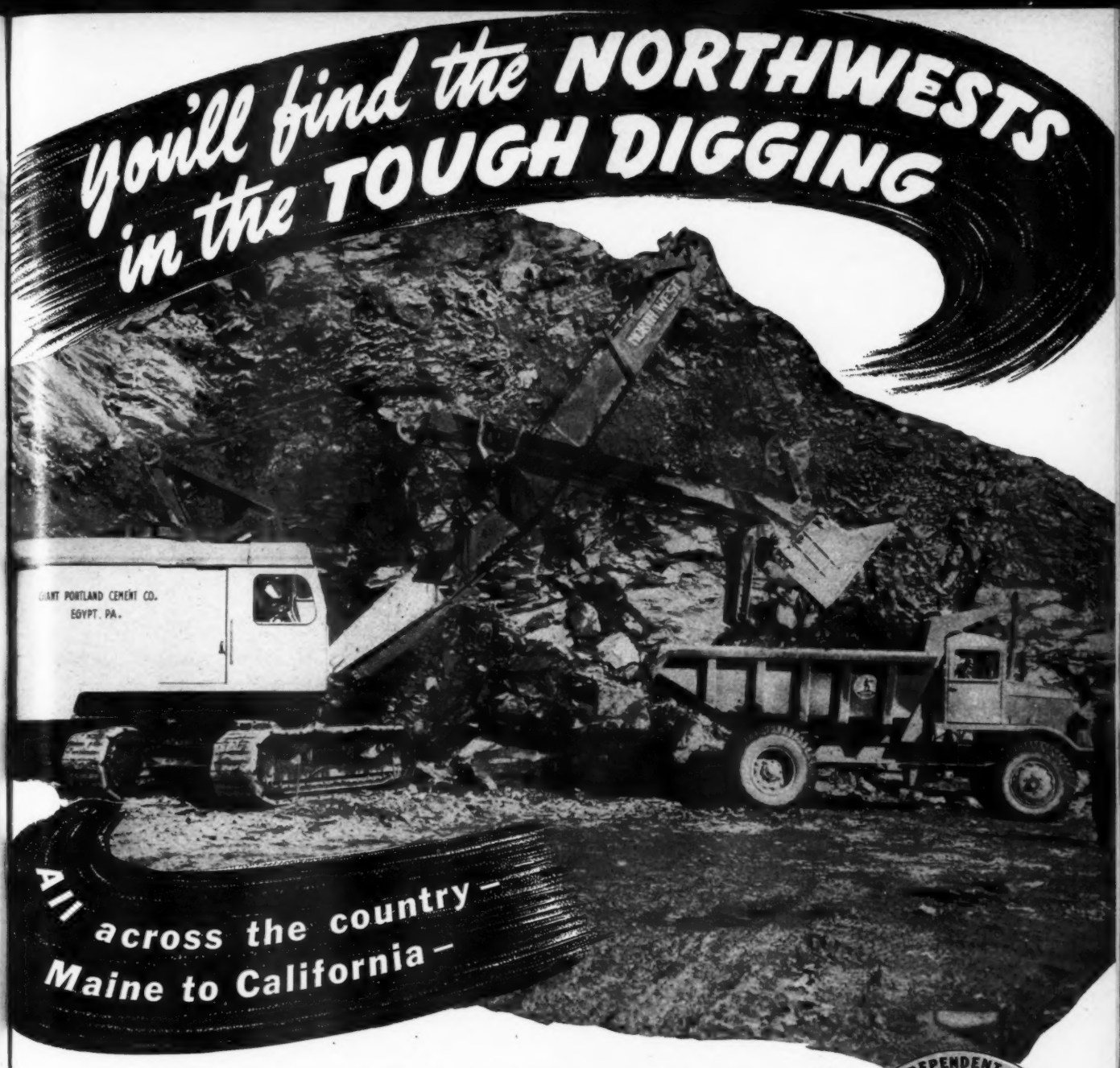
All grades, sizes, and types of Bethlehem wire rope can be obtained with the Form-Set construction.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

When you think WIRE ROPE . . . think BETHLEHEM

You'll find the NORTHWESTS in the TOUGH DIGGING



All across the country—
Maine to California—

Built to take the punishment of rock digging, they bring you advantages that mean output in the toughest going.

The Northwest Dual Independent Crowd utilizes force other shovels waste. The Northwest Welded Boom with its rugged sticks tied together at the inner-end provides a front-end that will stand up to the toughest digging you'd ever put a shovel in. The Cushion Clutch eliminates the effects of stock overload to parts under power when the dipper hits an immovable rock Uniform Pressure Swing Clutches take the grabs and jerks out of swinging, and last but not least the "Feather-Touch" Clutch Control assures easy operation, yet retains the feel of the load.

Mark it up for those future jobs you are going to bid on — it's a money maker.

NORTHWEST ENGINEERING COMPANY

1750 Steger Building — 28 E. Jackson Boulevard — Chicago 4, Illinois

INDEPENDENT CROWD — AUTOMATIC CROWD
FOR GREATER DIGGING POWER
The DUAL CROWD

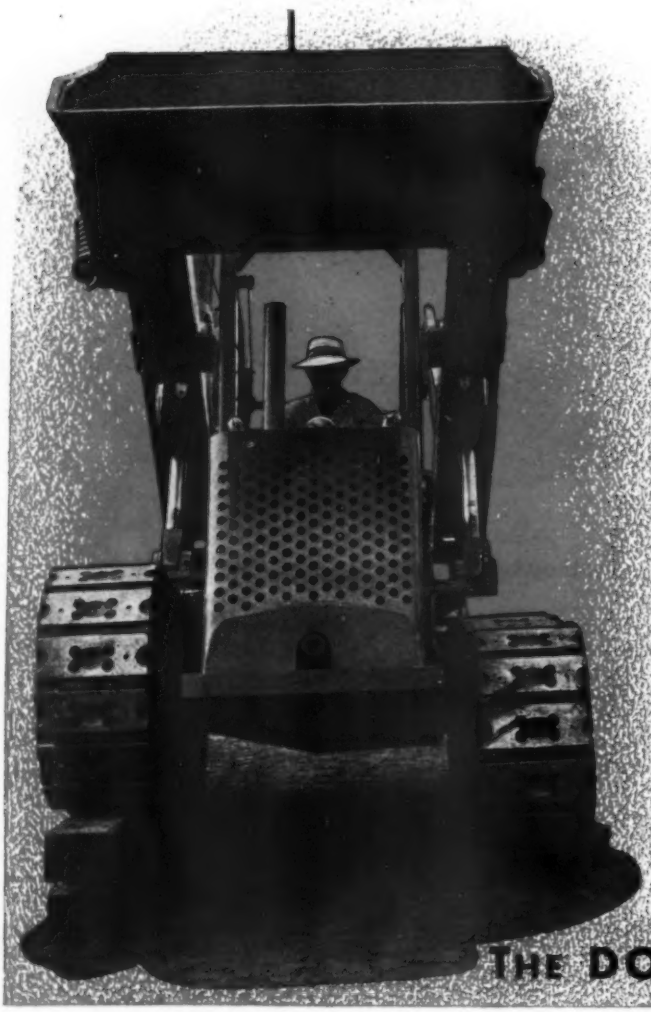
If you have a REAL ROCK SHOVEL you never have to worry about output in dirt!

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

The Bucyrus-Erie DOZER-SHOVEL

The only front end shovel that gives you OSCILLATING TRACK ADVANTAGES



THE advantages of free track oscillation have been thoroughly proved wherever crawler tractors are used — yet only one front end shovel permits taking full advantage of this tractor feature: the Bucyrus-Erie DOZER-SHOVEL. In designing the DOZER-SHOVEL for use with International TracTracTors, Bucyrus-Erie engineers developed a balanced unit so perfectly matched to these tractors that all their inherent operating features are retained. Among these features is free track oscillation — something you can get with no other front end shovel — which holds these output-contributing advantages for you:

Front and Side Stability

With full free oscillation of the TracTracTor tracks, both "feet" stay on the ground, permitting riding over obstacles with full knee action. That means freedom from shock loads

THE DOZER-SHOVEL Scoops, L

and the spillage and tipping common on fixed track machines.

Full Tractive Effort

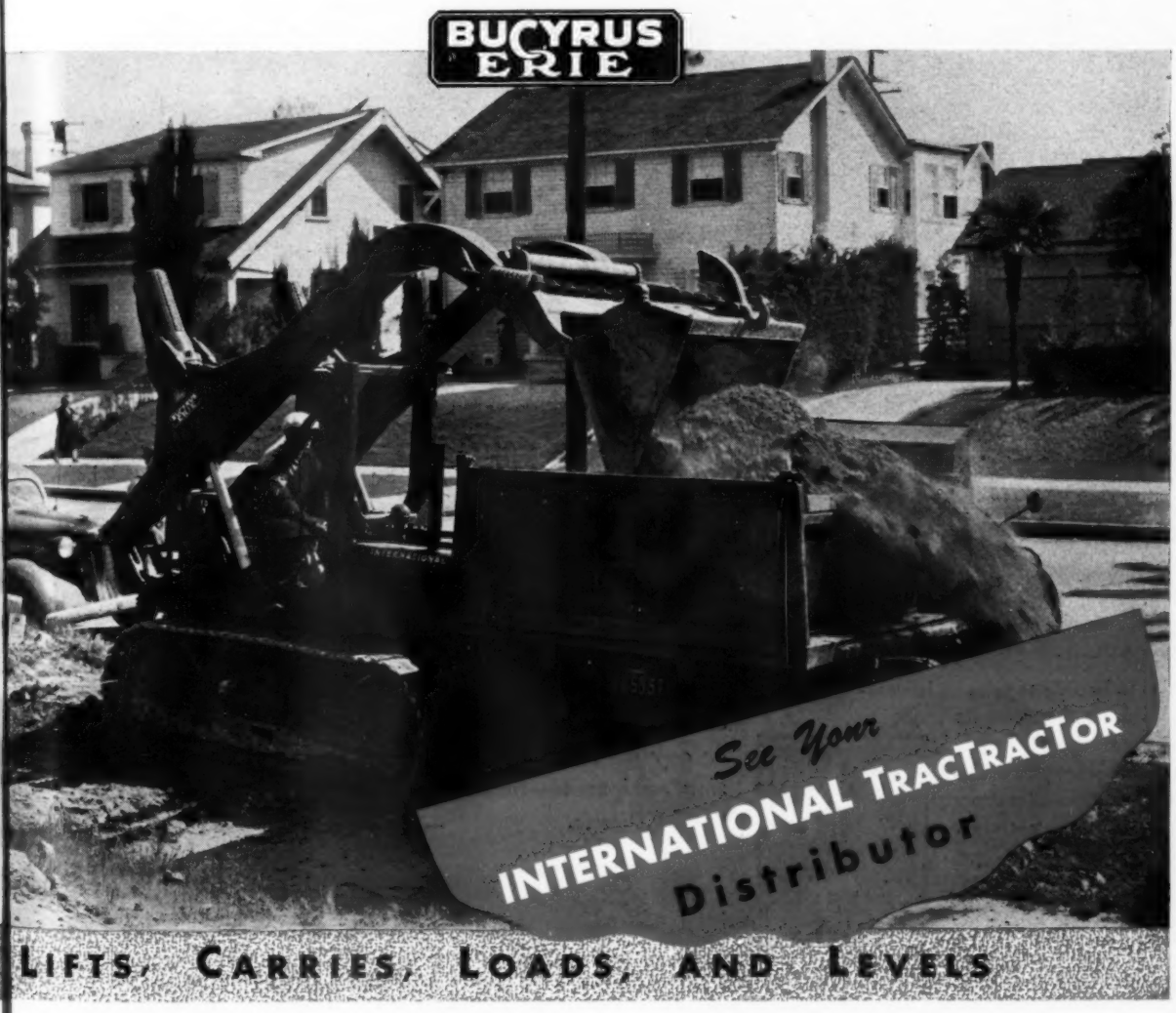
Because free track oscillation is retained, the DOZER-SHOVEL provides maximum track-to-ground contact that permits full use of TracTracTor power in digging, traveling, and bulldozing.

Even Digging

Oscillating tracks make possible continuous ground contact of shovel bucket or bulldozer blade. Smooth level cuts and close finishes are easy to make.

Smooth Riding

Because the oscillating tracks ride over obstacles easily, the operator is not subjected to the severe jolts and jars that cause excessive fatigue and slow up production. Find out from your International TracTracTor distributor about the many other reasons why a DOZER-SHOVEL and International crawler tractor combination is a really outstanding dirt moving tool. He'll tell you about its versatility, full front visibility, low overhead clearance, positive down pressure, easy interchangeability from shovel to bulldozer, and simple strong design. **Bucyrus-Erie Company, South Milwaukee, Wisconsin.** 8ET46C



For Great Diesel Power

take a cue from the Oil Fields

GM "Quad 6"

WHY are more and more drillers turning to General Motors Diesel engines?

Drilling for oil is 24-hour-a-day work, so an oil man's power has to be dependable.

It has to be able to take on increasing loads as the well gets deeper. It has to be reliable and require the minimum of maintenance. And it has to be portable.

GM Diesels fill all the oil-drillers' musts—then give them more. They are compact and powerful. They can be moved into a job fast and out again when it's done.

So whatever needs for power you may have in road-making machinery, cranes, shovels or any other construction equipment—look to GM Diesels.

Features of GM Diesels Important to Every User of Power

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LOW COST—run on common fuel oil

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LESS FIRE HAZARD—no volatile explosive fuel

COMPACT—readily adaptable to any installation

SMOOTH OPERATION—rotating and reciprocating forces completely balanced

QUICK ACCELERATION—2-cycle principle produces power with every downward piston stroke

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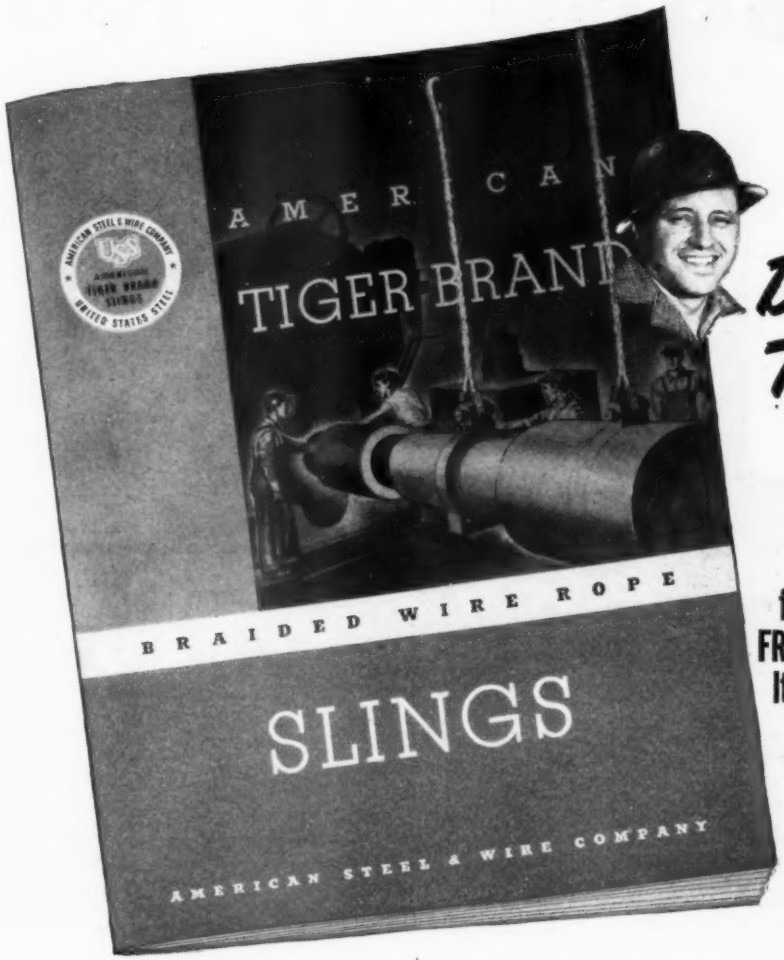
IMPORTANT *NEW CATALOG* ON TIGER BRAND BRAIDED WIRE ROPE SLINGS



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HERE'S a reliable source book that tells you quickly what you want to know about braided wire rope slings—the safest, strongest kind of sling you can use. Shows different types . . . gives safe working loads. It's a useful little book you'll refer to time and time again. Write for your copy today. Address the office nearest you.

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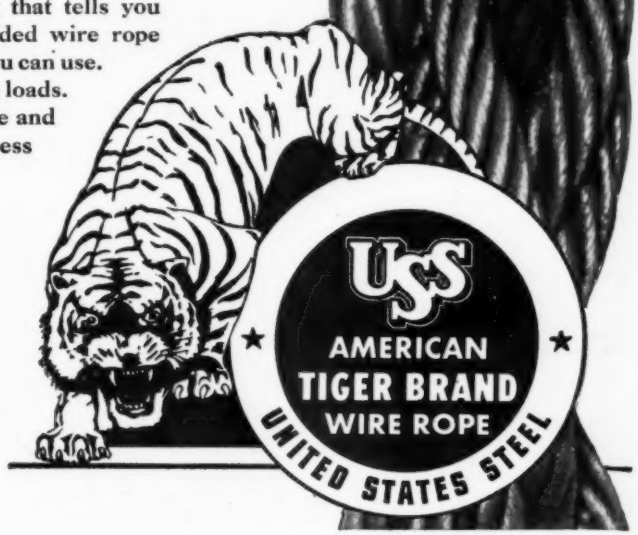
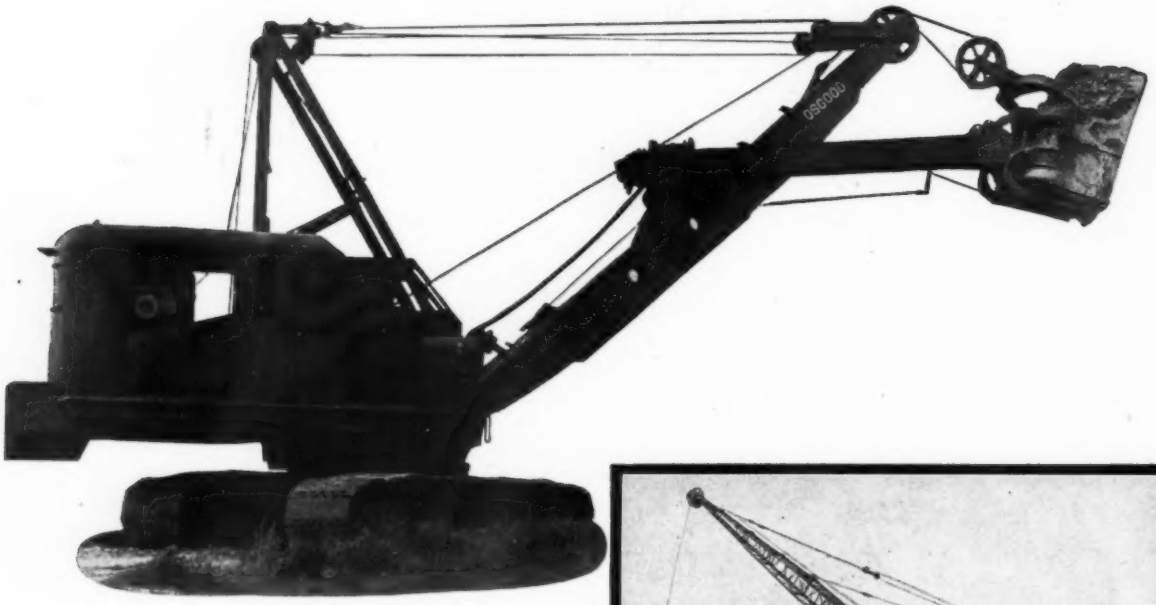


Built FOR THE *Big* JOBS!

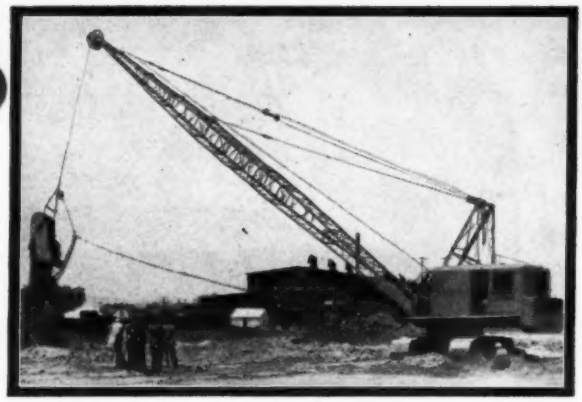
The OSGOOD *Type* 100



SHOVEL • DRAGLINE • CLAMSHELL • CRANE

From crawler treads to point sheaves, the new OSGOOD Type 100 is designed and built to handle the big jobs. As shovel, dragline, clamshell or crane, the Type 100 will wade right into the toughest work you have and turn in a profit-making performance. Powerful and sturdy, the Type 100 is completely air-controlled, providing an ease of operation that means just as much production in the last hour of the day as in the first.

Air booster brakes and air-controlled steering contribute to the smooth performance of the Type 100. A conveniently arranged bank of hand levers and foot pedals control every operation of this new machine. Positive air control enables the operator to get the "feel" of this powerful unit instantly. Self-cleaning treads, oversize point sheaves, a new quiet-operating swivel-type fairlead and a host of other features of interest to every construction, excavating and material handling engineer are completely described in the new Type 100 bulletin. Get your copy now!



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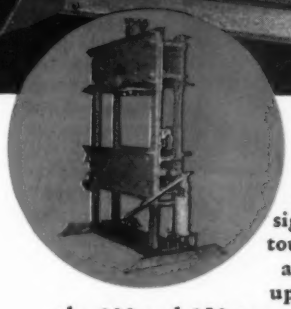
OSGOOD
SHOVELS, DRAGLINES CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

RODGERS SHOP PRESSES



The improved Rodgers Heavy Duty Shop Presses are designed to handle those 101 tough pressing, squeezing and forcing jobs you run up against so often. Both the 100 and 150 ton models offer a versatility of use not found in any other tool.

Rodgers Shop Presses have a moveable bolster which is simply raised or lowered by a crank and positioned by pins in the frame. The cylinder is adjustable across the entire frame width and may be mounted inside the top frame or suspended below it. Open sides of the frame allow long pieces to extend beyond width of the press. Construction is of rolled steel plate. Power is supplied by the Rodgers 4-speed Hand Pump conveniently mounted on the side. A Rodgers Power Pump Unit is available when desired.

You will save time, labor and trouble with a Rodgers Shop Press — write for details.

SPECIFICATIONS

100 TON SHOP PRESS

Model No. 108A	Bolster Opening		
Specifications	Standard	18"	24"
Overall Height—6½" Ram Travel	85½"	85½"	85½"
Overall Height—13" Ram Travel	94⅜"	94⅜"	94⅜"
Floor Space — Base	44"x63⅜"	44"x63⅜"	44"x63⅜"
Hoist Extends Beyond Base	9"	9"	9"
Pump Handle Extends Beyond Base	1⅜"	4½"	7½"
Width Between Side Members	45"	45"	45"
Depth Between Side Members	8½"	14"	20"
Depth Between Bolsters (Work Table)	12½"	18"	24"
Maximum Daylight	35"	35½"	35½"
Minimum Daylight	7"	7½"	7½"

150 TON SHOP PRESS

Model No. 109A	Bolster Opening		
Specifications	Standard	18"	24"
Overall Height—7½" Ram Travel	89"	89"	89"
Overall Height—13" Ram Travel	97¼"	97¼"	97¼"
Floor Space — Base	44"x70½"	44"x70½"	44"x70½"
Hoist Extends Beyond Base	9"	9"	9"
Pump Handle Extends Beyond Base	1⅜"	4½"	7½"
Width Between Side Members	48"	48"	48"
Depth Between Side Members	8½"	14"	20"
Depth Between Bolsters (Work Table)	12½"	18"	24"
Maximum Daylight	35½"	35"	35"
Minimum Daylight	7½"	7"	7"

Matched set of "V" blocks are included as standard equipment for both 100 and 150 ton presses.

The new Rodgers "Sixty"—60 ton Shop Press has the same features as the larger models—ideal for hundreds of uses. Write for literature.

Rodgers Hydraulic, Inc.

HYDRAULIC POWER EQUIPMENT

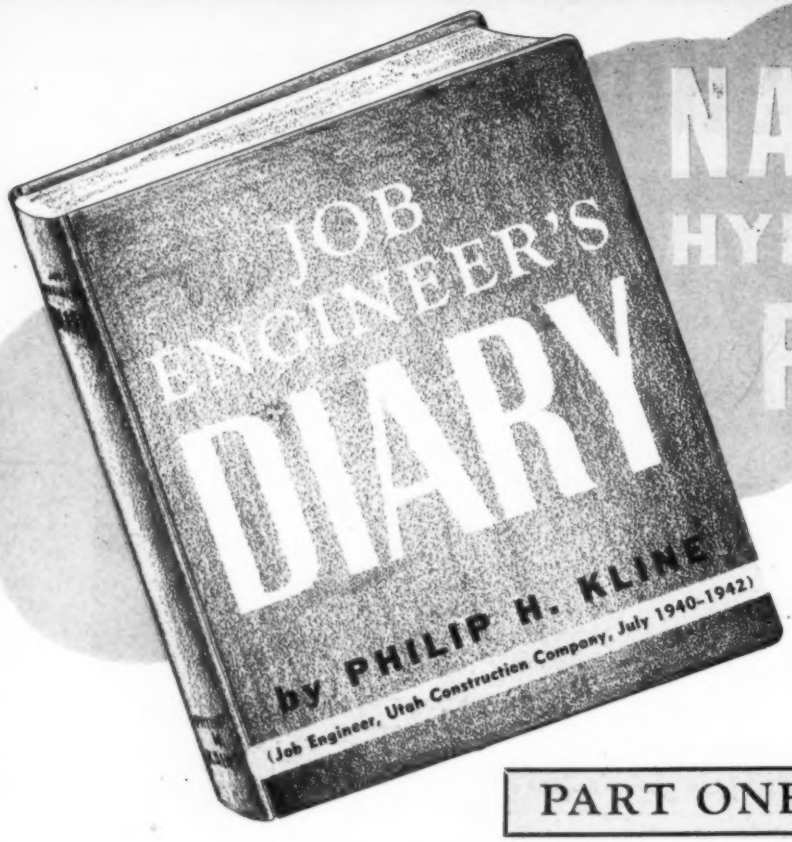
Shop Presses

Crawler-Track Presses

7417 Walker St., St. Louis Park, Minneapolis 16, Minn.

Power Pump Units

Portable Presses



NANTAHALA HYDRO-ELECTRIC PROJECT

PART ONE

Starting one month after arrival of key men and opening of temporary offices on the site, this diary, with illustrations, carries through progressively to completion construction in North Carolina of a 60,000 h.p. hydro-electric project for the Nantahala Power and Light Company, a subsidiary of the Aluminum Company of America. The project was designed to expand the power and light system and supply increased wartime demand for electro processes in an aluminum plant at Alcoa, Tennessee. Emphasis is given to excavation in this report of plant and equipment used, descriptions of setups and performance, job quantities and conditions involved, special features of the job, summaries of various records and history which are interspersed with the author's observations.

Editor's Note: The story of the construction of Nantahala Dam and appurtenant works in the uplands of North Carolina's scenic mountains provides such a wealth of excavating techniques and special adaptations of equipment to meet conditions that **Excavating Engineer** requested Philip H. Kline, job engineer for the Utah Construction Company of San Francisco, California, contractor on this project, to give us from his diary the highlights of the modern construction features, with special emphasis on the excavating work.

• Philip H. Kline

Although the information is presented chronologically, the author has avoided repetition of similar successive developments by bringing the reader up to date, as he goes along, stressing highlights of the various parts of the job when they occurred or came to attention at their completion. Lengthy technical discussions are eliminated through the use of numerous pictures, charts, and tables to illustrate the text.

Mr. Kline has purposely used field "lingo" to a great extent so he could tell his story in a shorter manner and enable him to use his diary notes in a more literal manner.

Through the courtesy of The Utah Construction Company and the Aluminum Company of America we bring you, in a series of three articles, this on-the-job description of an interesting and efficiently-operated construction project.

FROM A "dirt moving" viewpoint, the construction of a high rock-fill dam presented the most formidable challenge of all features of the project. There were over 2,000,000 cu. yds. of material to quarry, excavate, or get from borrow pits. Much of this material required processing and all of it required the most careful placement.

At the power house, about ten miles downstream on the primitive gorge of the Nantahala River, a long tailrace excavation developed additional firm power "head." The power house itself was set deep in rock at the end of a 1200-ft. penstock leading from a tunnel outlet about 550 ft. elevation above the 60,000 h.p. hydraulic turbine. Between the dam and the power house over five miles of solid rock tunnel was bored in a 13x14-ft. horseshoe shape. Three large diameter shafts on the project provided tunnel control devices. Six tunnel portals, a 240-ft. deep "air vent" hole, preparation of the dam foundation, and a side-channel spillway cut were among other job design requirements which involved major excavating operations.

Construction time limitations and the inaccessibility of the various sites were of serious import to

the contractor. Considerable preparatory work had to be done at camp and shop locations. Large amounts of heavy equipment had to be shipped in, hauled up 22 miles over mountain roads, assembled at the site and maintained for two years without benefit of existing nearby machine shops, or sources of supply usually found on less remote construction jobs. The manpower situation was fair but considerable "breaking-in" and safety and team work education was necessary on such large scale operations. Careful planning of the sequence of construction allowed scheduling of permanent material delivery, and made possible exchange of equipment and plants with other widespread activities of The Utah Construction Company. Cleanup and disposal of salvageable items was given particular attention due to the critical situation developed by war shortages.

Introduction

The diary starts one month after arrival of key men and opening of temporary offices about ten miles from the nearest job site. There have been hectic days and nights of hotel bedroom strategy to assemble men, machines and materials as rapidly as possible. Buyers and suppliers have kept the wires humming. There seems to be no end to a day's work — so much has to be done at once. Summer has started slipping by and the war clouds gather ominously. Hitler "has done it" and the construction forces have their sleeves rolled up. This is the atmosphere. Let's see what happens.

DIARY

August 8, 1940—What a hike! And what an access road that will be! Went around those mountains about six times to keep that 6% grade to the Dick's Creek portals. The D-8 with an Angledozer and the new Caterpillar "12" Patrol Grader have already started up the existing road to Morgan's Gap. It will take some blading around those log bridges; they won't stand much more than a 2½-ton truck. Walked on up to the dam site where they are clearing and burning better than an acre a day on steep hillsides and the campsite is about 30% ready. P.S. I wouldn't have minded the hike, but the boy who was to drive us to town just "allowed he forgot" and thank goodness the Super came out for us, interrupting his evening meal. It would have been a long way to town.

August 15 — Sixty inches of rain, that's what the hydrologists tell us to expect a year in this country. But it didn't need to deposit a seven-weeks' supply in 48 hours. The ten-mile highway to the dam was just getting started. The skid-mounted Sullivan diesel (540 cfm) compressor was keeping the jackhammers busy on both sides of the river, but two or three of the bridges are under water now. They "held" nicely in spite of the heavy driftwood from upstream logging operations (not our workers). Some fill was washed away and the new roads are requiring rock and more rock to keep the trucks rolling. Heavy equipment is coming in fast at the unloading dock, nearly all first major items are now here or on the way. (See equipment list.)

• Bridge No. 3 ← Highway to dam.

• Northwest shovel in boggy ground.

• Installing blower in Portal No. 1.

August 22 — Dirt slides and boggy ground hampered operations at the Dick's Creek portals. A corduroy roadbed will be provided. Koehring Dumptors and a Northwest "80" shovel will remove close to 40,000 cu. yds. at this location. Portal No. 1 required plenty of scaling and temporary shoring.

August 31—The first round was fired at Portal No. 1, but mucking machine and haul-motor delays

• Completed dam and reservoir partially filled. In the uplands of North Carolina's scenic mountains, this rock fill structure impounds water which is conveyed through tunnels to a power house ten miles downstream. The intake tower is seen at the center with a control by-pass tower at the left end of the dam. The crest of the dam is over 1,000 feet long and leads to a side-channel spillway controlled by three Taintor gates and two "fuse plugs." The outlet of the spillway is at the right center background, allowing excess water to flow to the ravine formed by the old river bed.

• Hydraulic sluicing at dam. Note roots and decomposed sandstone overburden.

• Cherry picker frame ahead of Conway mucker at Portal No. 2.

are slowing up organized advance. Powder houses, change houses and temporary access is now well along. A contract will be let to surface some of the new roadway. Will use 3-inch to ¾-inch base stone about six inches deep with a ¾-inch down surface course about two inches deep. Considerable attention is being given ditching and culvert installations.

September 7 — Much stripping at dam site is to be done with hydraulic giants. At the height of the job, a total of 143 pump hours, at an average head of 170 feet, was recorded during a week's work. In that period about 4300 sq. yds. of abutment were cleaned and close to 8600 cu. yds. of material moved. Two Cameron "ALV" single-stage centrifugal pumps will supply 4210 gpm each at 275-ft. head through "Victaulic" coupled distribution lines. Over 3000 feet of 8-inch, 10-inch and 12-inch spiral welded pipes will be needed. A No. 2 "Giant" nozzle, fitted with a deflector will allow effective one-man control of the direction of the jet.

September 15—Clearing on the

GENERAL LIST — MAJOR EXCAVATING EQUIPMENT USED*

QUAN.	ITEM	MODEL	MAKE, AUXILIARIES AND REMARKS
11	Air Receiver	Av. 48"x144"	New and Used (includes tunnel installations)
3	Breaker, Paving	K-10	Sullivan
44	Drifter Drill	AF 99N	Gardner-Denver (tunnel headings)
2	Drifter-Sinker	1¼" Round	Gardner-Denver
4	Drill Sharpener	D-6	Gardner-Denver (complete with accessories)
1	Drill Sharpener	50	Ingersoll-Rand
2	Furnace, Oil	DF 1	Gardner-Denver
1	Furnace, Oil	27F	Ingersoll-Rand
48	Jackhammer	S-55, 73, 79	Gardner-Denver
6	Jackhammer	175	Worthington
6	Spader	28E	Gardner-Denver
5	Stoper	R-104	Gardner-Denver
8	Backfill Tamper	34	Ingersoll-Rand
2	Dragline Bucket	RC 2½ cu. yd.	Page
1	Dragline Bucket	RH 1½ cu. yd.	Page
1	Dragline Bucket	¾ cu. yd.	Esco
48	Dump Car	5 cu. yd. 36" gage	Western
14	Dump Car	5 cu. yd. 36" gage	American
24	Dump Car, 3 yd.	V-type 24" gage	Sanford-Day
6	Compressor	Sta. 1335-870 cfm	Sullivan & Worthington
5	Compressor	Sta. 420 cfm	Gardner-Denver (4), Ingersoll-Rand
3	Compressor	Portable 445-315 cfm	Gardner-Denver (2), Sullivan (Diesel skid-mounted)
9	Angledozer	AK-8, WC-7, CKD-8	LeTourneau
1	Grader, Motor Patrol	12	Caterpillar
9	Locomotive, Elec.	36" & 24" gage	Various used
2	Locomotive, Diesel	36" DCL	Plymouth
6	Light Plant, 1500 watt	E, EH	Kohler
10	Power Control Unit	R8, TE, etc.	LeTourneau
2	Power Control Unit	WJ	Wooldridge
1	Jaw Crusher	1133—36"x42"	Kennedy-VanSaun
1	Rock Crusher plant complete—Primary & Sec.		Cedarapids (portable with screens)
2	Tamper Roller	DSR 176	LaPlant-Choate
1	Ripper	RH-3	Wooldridge
1	Drag Scraper	S8-1060	Sauerman
4	Scraper-Carrying	LU, 7-CN, TGN	LeTourneau (1), Wooldridge
4	Wagon Drill	UPW-35, UMB	Worthington (3), Gardner-Denver
1	Shovel, All Electric	120-B, 5 cu. yd.	Bucyrus-Erie (shovel and dragline attachments)
1	Shovel, Diesel	392—2½ cu. yd.	Marion (dragline attachment)
1	Shovel, Diesel	1201—3½ cu. yd.	Lima
3	Shovel, Diesel	80-D, 2½ cu. yd.	Northwest
1	Shovel, Diesel	30-B, 1 cu. yd.	Bucyrus-Erie
1	Shovel, Diesel	B-4	Link-Belt
1	Shovel, Gas	10-B	Bucyrus-Erie
1	Screen, Vibrating	C-11	Robins
3	Rock Skip	60"x60"x18"	Dempster
5	Tunnel Mucker, Esco Bucket	60	Conway
24	Truck, Dump, 10-12 cu. yd.	5-FD	Euclid
9	Truck, Dump, 6 cu. yd.	WD-60	Koehring
13	Truck, Stake & Misc.	Various	Various
11	Tractor, Crawler	D-8	Caterpillar
2	Tractor, Crawler	RD-7, D-4	Caterpillar (one each)
1	Trailer, 7 cu. yd., 15 ton	M-1060	Athey (crawler tread)
1	Well Drill, Gas	53	Keystone (all accessories)
1	Well Drill	24-L	Bucyrus-Erie

* Does not include auxiliary items such as pumps, electric system and equipment, shop machines and tools, camp and service installations, light trucks, autos, plant bins, storage and reclaiming gates, conveyors, concreting items, etc.

• Right: Athey Mobil-loader on Caterpillar D-4 loading to Koehring Dumptor at by-pass inlet. Left: Bucyrus-Erie 120-B 5-cu. yd. electric shovel being erected with aid of Northwest.

west abutment of the dam is now complete, and bulldozer stripping has been started for excavation of the west approach plaza. Tunnel portal-sets are being framed and installed. Conway Model "60" mucking machines, powered by 75 hp motors, will feed five cu. yd. muck cars, operating on 24-inch and 36-inch gage tunnel tracks.

September 22—An Athey "Mobil-Loader" mounted on a D-4 tractor was tried out at the upstream tunnel portal excavation. Koehring Dumptors were used to receive the material for a short haul to a dump which will provide a working area along the river bank. The rig is light for the combination of rock and dirt that it has to handle.

September 30 — Our new 5-cu. yd. Bucyrus-Erie 120-B electric shovel has arrived at the dam after careful maneuvering across the mountains and fording of several streams. The erector is on the job and assembly and final testing is going forward rapidly. This machine will make the dirt fly on heavy overburden cuts and will be just the ticket for handling the heavy fragmentation expected in the quarry.

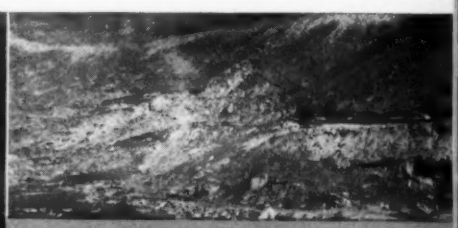
October 8—Planning and scheduling of the 55 bid items and related preparatory work is now nicely under control. Each calendar period has definite work assigned to it, and equipment rates of production and co-ordination of loading and hauling units have been outlined. An estimate of the drilling requirements allows tentative spotting of compressor units. Equipment needed and approximate dates of use are listed. Permanent material has been noted for latest arrival dates. From this overall picture it will also be possible to secure the drawings needed, line up the facilities installations and arrange force distribution.

October 15—A scale model of the existing ground conditions at the dam site has been constructed of wood by sawing out each contour and placing the strips by the co-ordinate control system. Removable sections show the graded portions as the area will look upon completion. The dam crest and slopes have been marked out and the limits of foundation preparation are easily discernible.

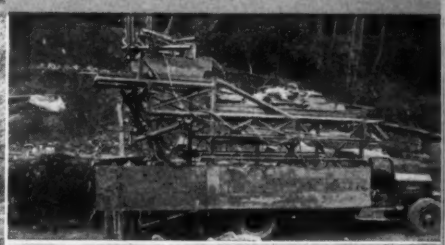
October 22—The 420-ft. shaft at the surge tank has now been raised nearly 100 feet. This is a 4.5'x4.5' excavation using stopers operated from removable platforms. Later a timber man-way will be built, and the pilot raise continued to break-thru at the ground surface. The muck that is now being drawn off in tunnel No. 1, will be considerably increased when widening out operations take place. The enlargement of this pilot hole to 22 ft. and 10-ft. diameter sections will be a down-drive operation.

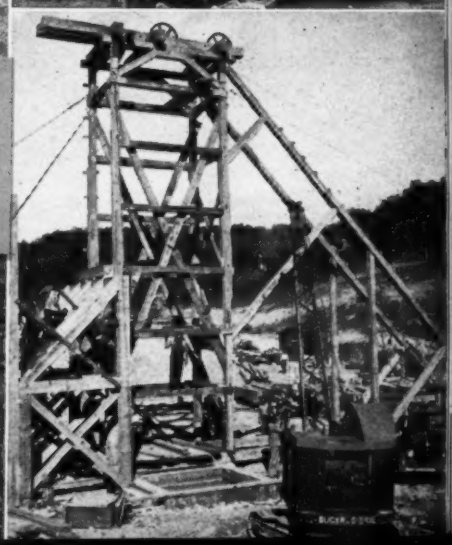
October 31 — Stripping of the east and west abutments of the dam is now well along. Working areas on each side are fast approaching completion and the sluicing operations are progressing rapidly down the slopes. Koehring Dumptors and Euclid 10-12 cu. yd. boulder dam-type body trucks are used to haul from power shovel operations.

November 8 — Unique devices are being used on tunnel operations. A truck-mounted drill jumbo allows fast ingress and egress to the large (19-ft. diameter) by-pass tunnel. If drilling times can be staggered at upstream and down-stream headings, it will be possible to use this assembly alternately, driving the truck about a half-mile over a temporary road around the toe of the dam. Much construction material can also be interchanged by use of that connecting highway. Plymouth diesel locomotives can also be used for hauling out muck, as were the Koehring Dumptors,



• Above Left: Sluiced west abutment and plaza. Above: East abutment, sluicing lines, and spillway road. Below: Truck-mounted by-pass tunnel drill jumbo.





• Above: Koehring Dumptors, Euclid truck and Northwest shovel on plaza at elevation 2910 plus. Below: Conway mucking into Dumptor at by-pass outlet portal. Right: Bucyrus-Erie 10-B crane used for erection of by-pass shaft headframe and cable.

• Road to Portal No. 1 at switch-back.

while excavation was close to the portal.

November 15 — The Bucyrus-Erie 10-B ⅜-cu. yd. shovel, which has been as "handy as the pocket on your shirt" in many job locations, was used to erect the head frame for the by-pass tunnel shaft sinking operations. This shaft will be driven with jack-hammers, mucking into a 25 cu. ft. hinge-type bucket to be unloaded into a chute at the headframe. This operation together with the intake nearby shaft will total some 400 feet of shaft depth and will use the same equipment in successive order. Under the direction of George Ronian, Shaft Supt., complete lists of timber, tools, supplies and equipment have been made up so that all needed items are on the job for that work and there can be no holdup. The shafts are 11′x19.5′ and 16′x22′ cross sections.

November 22 — The access to Portal No. 1 and to the surge tank present some real difficulties. As a result of freezing and thawing weather on steep roads, hurriedly cut out by bulldozers, rubber-tired equipment now will not get the men and supplies to the site. It will be a major operation to dig out a new alignment. The difference in elevation between the surge shaft plaza and the power house floor is nearly 1000 feet. That means 6000 to 7500 feet of side hill roadway at a maximum grade of 6%. Large culverts will have to be placed at switch-backs and hairpin turns across ravines.

• Marion dragline at upstream end of spillway cut. Soft rock may be suitable for quarry run upstream blanket of dam.

November 30 — Dragline work at the dam has been effective both at the river bank and on the higher slopes. The long reach of the Marion boom, coupled with expert "casting" has eliminated difficult truck access problems. It was found that large loose rock and boulders could be moved off the steep side slopes by a rigging tractor and carefully manipulated cable lines. However, it took the Bucyrus-Erie 120-B (5-cu. yd.) loading shovel to clean up the piles so accumulated which were loaded into Euclids and hauled upstream to a spoil dump. Usable rock was placed on haul roads.

• Left impervious seal base with Worthington wagon drill and diamond core drill in foreground.

December 8—The quarry plan is now beginning to develop. The outlet area will be used to situate a full machine shop, warehouse, service shops and steel sharpening equipment. Many buildings will be placed on skids, but the shop will have full concrete floor and access pits.

December 15 — Wagon drill tests and detachable bit tests were run to determine best operating practice for future quarry work. Careful time studies are kept by engineering-helper observers and recaps of production footage by makes of machines and conditions of operation are being watched carefully.

December 22 — The "impervious seal" area has now been staked and wagon drilling started. Cuts will range from 14 to 26 feet deep and all loose rock will be removed. A cut-off trench in solid rock in which grouting will be later carried on, will provide the first opportunity to place the clay seal or "core" of this rock-fill dam.

December 31 — Concrete plant assembly and layout has been

• Stripping downstream end of spillway. Some of rock is usable in dam construction.

started. All aggregate will be crushed and screened from job-excavated rock. Stockpiles are cleverly arranged taking advantage of the ravines and sloping hillsides. The Bucyrus-Erie 10-B, working as a dragline, scooped out a level bench and, with a crane attachment, assisted in erecting timber bulkheads in front of the ravine. Batcher bins or chutes will be filled from a dragline working on top of the cribs. By this method, trucks from the screening plant can drive to the upper side, back onto the pile and dump against the crib. A road in front of the cribs allows batcher trucks to deliver aggregate to the mixing plants.

January 8 — Quarry run rock was started in the dam proper this week. Spillway stripping is still a major operation; much of the rock being exposed is too soft for permanent use. Nearly 500,000 cu. yds. have been hauled to spoil banks or used on roads or for temporary fills. This has been accomplished during 225 7½-hour shifts since the start of the job or nearly 2200 cu. yds. per shift.

January 15 — The diversion tunnel headings have met and the shaft has holed through to the top of the tunnel. Trimming operations to insure full thickness of concrete lining is well under way. A "sunflower" surveying instrument is used to plot the cross-section of the tunnel at 10-ft. intervals. Overbreak is remarkably low, considering the rock cleavage planes.

January 22—Power house core drilling and tail race excavation by the Bucyrus-Erie 30-B 1-cu. yd. shovel started off work in this area. First cuts on the center line near the power house will run to 30 feet in depth. This 30-B is a used machine that has serial No. 4576 which makes its manufacture date about 1926. The Atlas diesel motor perks right along, and its use enables us to keep from moving sorely needed shovels from the dam area.

January 31—The Pennsylvania Drilling Co., which has contracted the core drilling on the project, has a busy program ahead. After exploratory holes at the power house and on the tunnel line directly above (near its outlet), additional proving holes were drilled at the Dick's Creek tunnel portals to determine rock conditions there. At the dam, core drills will sink holes for deep penetration high pressure grouting. It is remarkable how those boys can move those rigs up and down the "darndest places." Exploratory holes back in the mountains along the tunnel line will give them something to think about in the way of access.

February 8—A rigging tractor using a Sauerman bucket is doing a good job at the top of the seal trench. It reaches "way down" the slope and pulls up loose, soft rock and dirt so that foundation preparation below will remain clean and can continue without interference.

February 15—Percussion (wagon) drilling was started at the seal trench, for shallow (12-ft.) low-pressure grout holes. A grid of these holes on 10-ft. centers along the center of the cutoff area makes moving frequent. The irregularity of the excavated rock often places the drills in awkward positions.

February 22 — Tunnel driving has now started in earnest and all facilities are lined up. Considerable timber was placed at the various portals, over 100,000 board-feet having been placed to date. These are generally seven-segment sets with mud-sills. Careful cutting dimensions were given the miners by laying out the neat tunnel section to full scale on the mess hall floor.

February 28—A sub-contractor has set up a crusher plant at the power house to process tunnel muck for concrete aggregate needed at that end. Some crushed

(Continued on page 526)

• Bucyrus-Erie 30-B on tailrace and power house excavation. Note steep side slopes.

Off-street Parking

Cities giving increasing consideration to proposals for extensive underground or surface-building parking facilities to ease traffic congestion.

By BETHUNE JONES

CONSIDERABLE EXCAVATION and other construction work will be required by plans for off-street parking facilities and other projects being increasingly considered by cities throughout the country to free central business districts of mounting traffic congestion.

Because of the high cost of land in central business areas and in many instances the lack of available land, private commercial operation of off-street parking facilities to the extent needed to clear congestion is generally regarded as unfeasible without some form of government aid. Cities are thus giving increasing consideration to proposals for extensive underground or surface-building parking facilities which will be either leased to private operators or operated by municipal parking authorities. In many states enabling legislation will be needed to permit public or quasi-public financing and operation of such projects.

Union Park Garage

More than 100 cities have made inquiries concerning San Francisco's underground Union Park Garage and several cities have plans well advanced for similar projects. Accommodating 1,700 cars—as many as can normally park curbside in 100 city blocks, the San Francisco project is a subsurface garage, four stories deep, under Union Square, a public park in the heart of the downtown business district.

Opened for business in September, 1942, the San Francisco underground garage is a quasi-public corporation. The Reconstruction Finance Corp. put up $850,000 of its $1,500,000 cost, with the balance being largely subscribed by merchants. When the RFC and the merchants are repaid, the city will become sole owner. Operation has been so successful that it now appears the entire cost will be liquidated in 20 years, far ahead of original anticipation. Meanwhile, the city, which put up nothing, collects $5,000 annual rent and $12,000 a year more in leasehold taxes.

Under Boston Common

The Massachusetts legislature this year enacted a bill authorizing Boston to permit construction of a privately-financed and operated parking development under the ball park and parade ground on Boston Common. Expected to cost approximately $4,000,000, the project would include six three-level parking units with ramp approaches and total accommodations for 3,708 cars at one time. If the city grants authority to lease the area to private interests, it would not be obligated to pay any expenes or assume any liability but instead would receive a percentage of the income as rental or taxes during the life of the lease.

Detroit voters approved last November by a 4-to-1 vote a proposal for the construction in the downtown area of an underground garage designed to hold between 900 and 1,000 cars. The $1,816,000 cost of the project would be met by revenue bonds, to be amortized in 18 years by parking fees.

Construction of two underground parking stations in Milwaukee has been postponed by Perry G. Anderson, secretary of the Milwaukee Downtown Association. He suggests that Milwaukee County or a parking authority created by the City of Milwaukee finance the projects through issuance of revenue bonds. The underground facilities he proposes would accommodate a total of 1,488 cars at one time.

An underground garage, under Military Park in Newark, N. J., to provide for 1,200 to 1,400 cars, has been proposed by the Newark Planning Board. In New York City, the Regional Plan Association has urged official consideration of underground garages under public places, such as public parks. The Association said such facilities would be "feasible" in Brooklyn and Queens and in some sections of Manhattan and the Bronx.

Underground garages have been suggested in many other cities, including Washington, Memphis, St. Louis, Los Angeles and Kansas City. Early this year in connection with a proposed $2,500,000 bond issue to finance construction of a park and underground garage in the two blocks north of the Municipal Auditorium in Kansas City, it was predicted by City Manager L. P. Cookingham that "underground parking is the coming thing in congested areas, with modern traffic funneling large numbers of cars into business districts."

Parking Garages

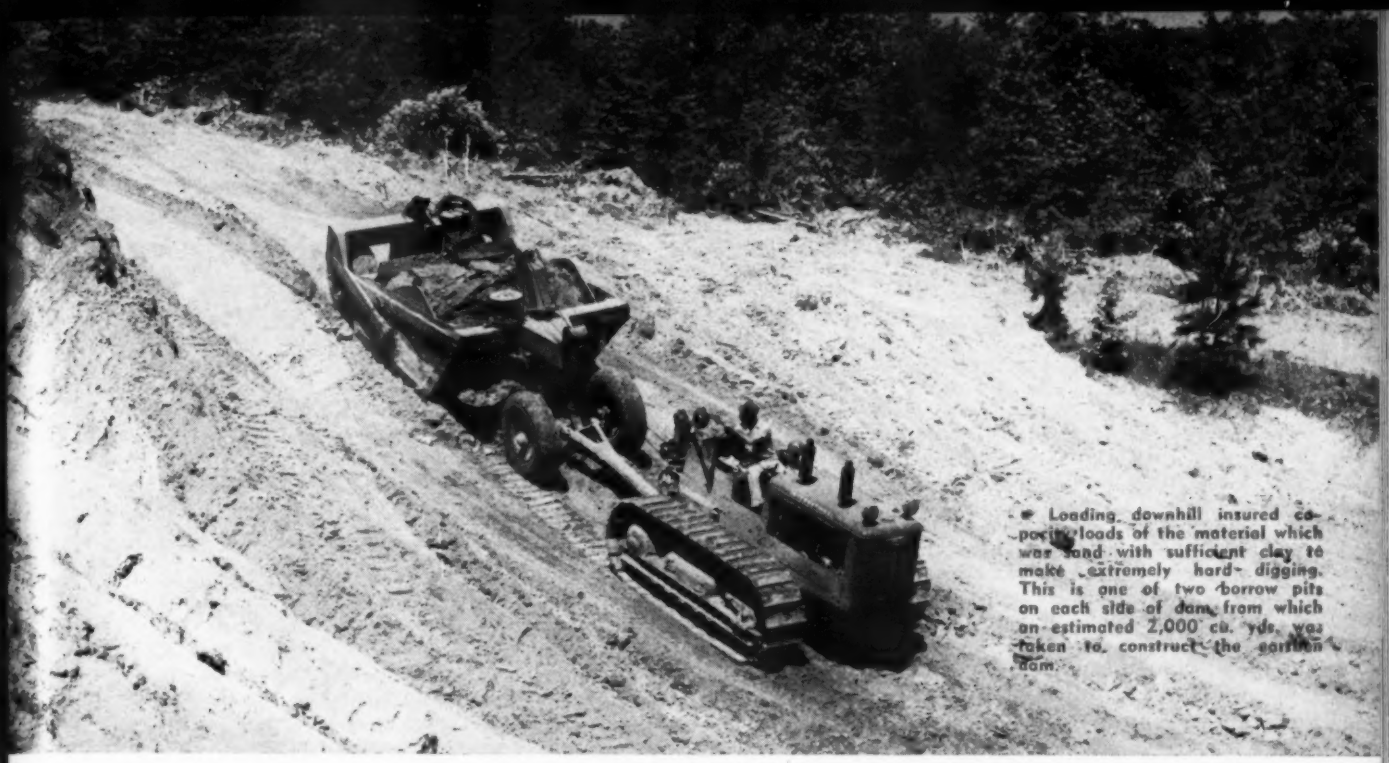
Construction of large above-surface parking garages also is being considered in a growing number of cities, especially where underground facilities are not practical for engineering or other reasons. Whether the trend will be toward outright municipal operation of such facilities, operation by "authorities," subsidies to private capital, or leasing to private operators has not been determined.

A further increase during the next few years in the number of cities establishing and operating off-street parking lots, parking garages, and underground parking areas is predicted by the International City Managers' Association, which reports that 280 American cities already are operating municipal off-street parking lots. This total marks an increase of 35 per cent over the number of municipal parking lots in use in 1942.

Reclaiming Land for Citrus

POWER - OPERATED EARTH-moving and land-clearing equipment utilized by Cleary Brothers Construction Company of West Palm Beach, Fla., recently made quick work of reclaiming and leveling a one-mile long and one-half mile wide tract of land west of Fort Pierce, Fla., for a citrus-growing project.

After the land was cleared and grubbed with bulldozers, drainage ditches were dug and the land leveled with tractor-drawn four-wheel scrapers. Finally, beds 22 feet apart were formed with a specially-built V-plow with ten foot wings on a road grader.



• Loading downhill insured capacity loads of the material which was sand with sufficient clay to make extremely hard digging. This is one of two borrow pits on each side of dam from which an estimated 2,000 cu. yds. was taken to construct the earthen dam.

• After loading downhill this Bucyrus-Erie 8-10 cu. yd. scraper powered by an International TD-18 TracTracTor is hauling fill through a cut in the old dam. New fill extends along edge of old dam, at left. The man in the center of the haul road is standing just about center of dam. To his right is barely visible penstock through which overflow is handled. Corrugated drain pipe runs under dam for overflow.

• Scraper about half discharged at this point and spreading material. Compaction was obtained by the digging unit only. Scraper is directly over outlet which is seen in the center of the picture. Trees at right are in reservoir. Due to swampy conditions brush will have to be removed by hand.

Creating Red Lake

By BLAINE S. BRITTON

RED LAKE, ARKANSAS, about nine miles from Little Rock, was built for T. R. Red by Artie Gregory, Little Rock contractor, in two and one-half days using an International TD-18 TracTracTor and Bucyrus-Erie S-90 8-10 cu. yd. four wheel scraper. An International TD-14 TracTracTor with Bucyrus-Erie bulldozer was used a few hours building an access road and putting fill material over the overflow pipe in the center of the dam.

The completed lake will be between five and eight acres when full and will be used for recreation only. Fishing, swimming, and dancing in a pavilion on the lake shore, will be the feature attractions.

The new dam, which will form the lake, replaces an older dam washed out about 15 years ago. Built of earth only, the new dam is 400 feet long and has a crest width of 16 feet, with the base of variable but sufficient width to maintain the height. Approximately 2,000 cu. yds. of earth, a sand and clay mixture, from borrow pits on both sides of the dam were moved by the scraper.

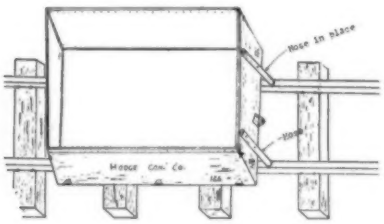
A stone and concrete penstock 14 feet high was built near the upstream face of the dam with six-inch holes at 12-inch intervals extending up the front for controlling the depth of water. A corrugated drain pipe runs under the dam to carry the run-off.

Field NOTES

Wheel Guards

Excavators alert to possibilities of accidents in connection with hauling material in dump cars usually take the following simple precaution — the placing of rail sweeps on the cars. Many accidents result when heavily-loaded dump cars drop rock or gravel on the rail which causes the following car wheels to be raised so high when riding over the material that the wheel flange is disengaged from the track and the car may tip or derail, and consequently pile up the entire string of cars.

The loss of time, damage to the equipment, and personnel injuries caused by this type of accident can many times be averted by the simple precaution of fashioning rail sweeps from short lengths of air or water hose and bolting them on both the front and rear of the car so that the ends of the hose just touch the top of the rails. With the "sweeps" in position, any debris falling and staying on the rails is brushed aside and it falls to the ground.



• Pieces of hose bolted to dump car act as sweeps to brush material off rails.

Explosive Safety Practices

Most explosives, except detonators, are best destroyed by burning, according to the U. S. Bureau of Mines.

The hazard of an explosion is always present, even under the most favorable conditions, so it is of prime importance to select a site where no damage will be done, either to persons or property, if the explosives detonate. This means a safe distance from any structure, railroad, or highway and from any place where one or more persons may be even accidentally exposed to danger, including that from flying missiles.

During the destruction of any type of explosives the possibility of preignition should be prevented by eliminating smoking and open lights.

Only one type of explosive should be destroyed at a time, and the utmost care should be taken to see that no detonators are accidentally included in explosives to be destroyed by burning.

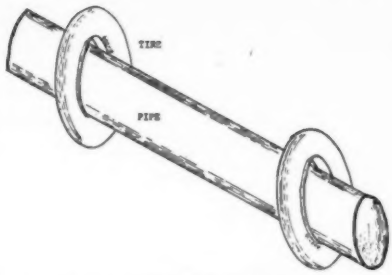
High explosives should never be burned in *cases* or in *deep piles*. Dynamites, especially permissible gelatins, become increasingly sensitive when overheated before ignition. Quantities of dynamite to be burned should not exceed 100 pounds of regular dynamite or 10 pounds of permissible gelatin. Local conditions may limit destruction to much smaller amounts, but when more than these maximum quantities must be destroyed, a new space should be selected for each lot, as it is not safe to place explosives on ground heated by the preceding burning.

No attempt should be made to return to the site so long as any flame or smoke can be observed.

As soon as all dynamite has been burned, it is believed to be good practice to plow the ground, as the residue remaining may contain salts said to be attractive to livestock, which if eaten may produce serious results.

Practical Use for Worn Tires

Discarded auto and truck tires can be put to good use by contractors alert to their possibilities. Large pipes, utility poles, barrels of tar, or other heavy round objects can be conveniently moved by employing the aid of cast-off tires. Heavy barrels are sometimes broken open when upset. By placing a tire over the top of the barrel before tipping, the tire provides a cushion when the barrel is dropped flat. Another tire can then be placed over the other end of the barrel and it is a simple matter to move the barrel to a different location. Contractors can make use of the casings in laying sewer or other types of pipe. When a crane is not immediately available, a tire is placed over each end of the pipe and the pipe is then rolled into a narrow ditch where it will lie suspended until the crane comes along to lower it.



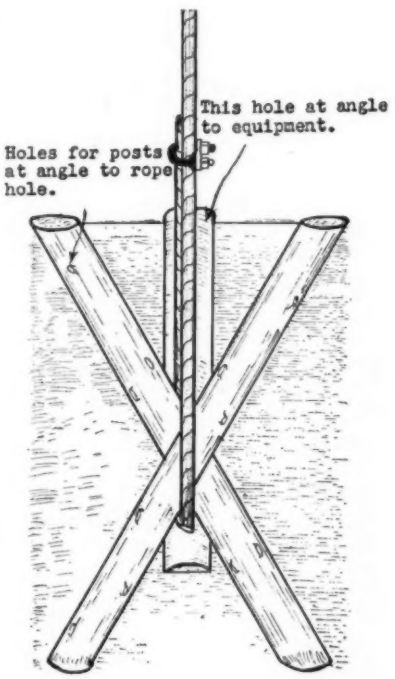
• Tires aid handling of large pipe.

Easily Installed Deadman

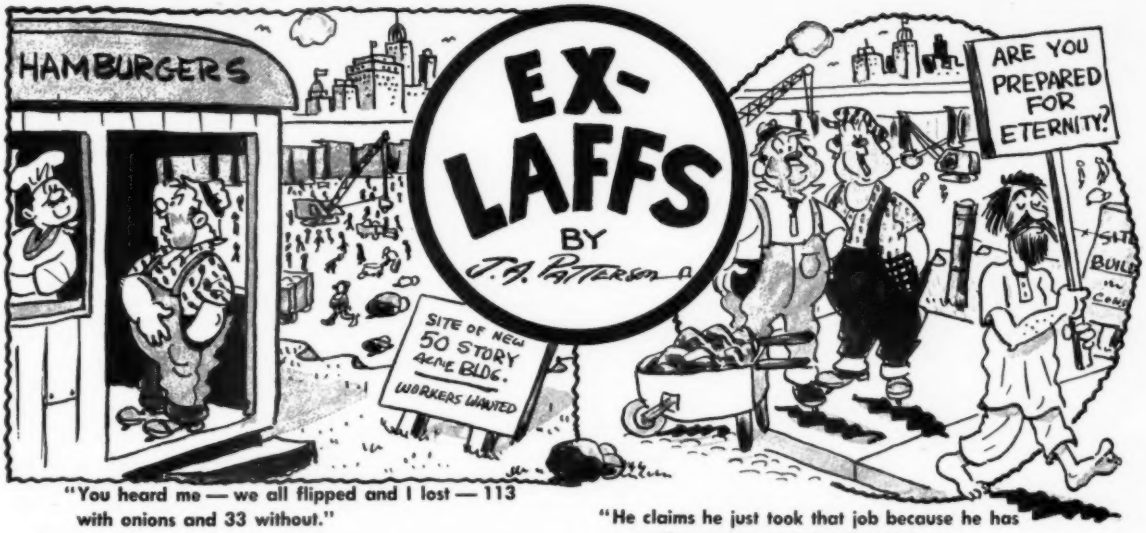
The amount of digging usually necessary to install a deadman for guy wires can be lessened measurably by using a large post digger and two posts.

The first of the three holes dug is the one for the wire rope and it is dug in the desired angle. The other two holes are put in at diagonals to the first hole and intersecting it. After the holes are finished, a loop is made in the wire rope and placed in the rope hole. The posts are then passed through the loop and the job is completed except for tamping in dirt to fill the holes. For a temporary job, the tamping may be eliminated.

W. P. HOUSER.

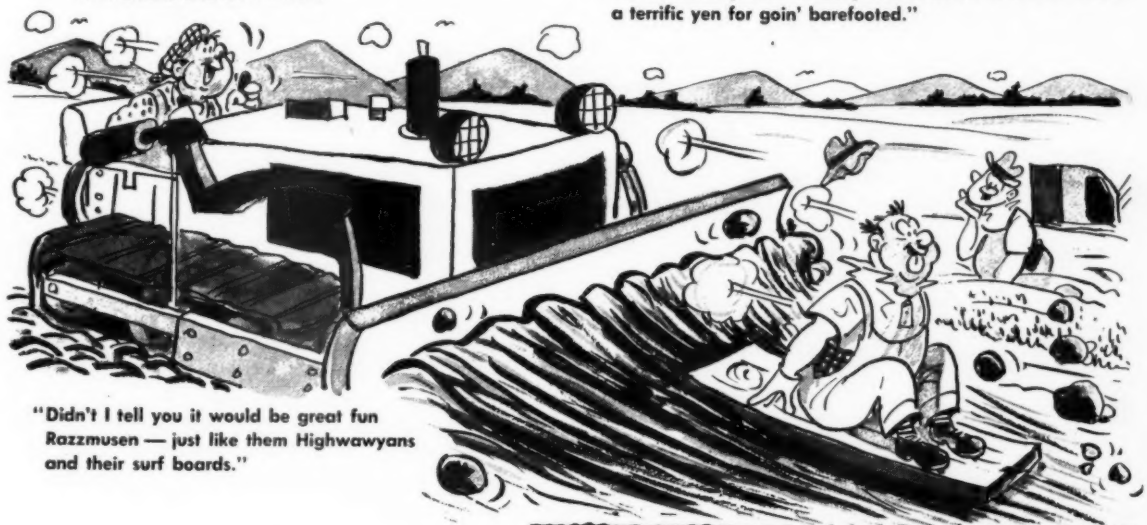


• Three holes and two poles make quick, reliable deadman.



"You heard me — we all flipped and I lost — 113 with onions and 33 without."

"He claims he just took that job because he has a terrific yen for goin' barefooted."



"Didn't I tell you it would be great fun Razzmusen — just like them Highwawyans and their surf boards."

"Sure, Gus, I know you said the date you were gettin' me was a nice girl but — ".

"If you think that's something, you should see how the big goon has his car rigged up!"

Equipment you ought to KNOW ABOUT

For further details about the equipment on these pages please write to the manufacturer, mentioning Excavating Engineer.

Decimal Point Slide Rule

Manufacturer: Pickett & Eckel, 53 W. Jackson Blvd., Chicago 4, Ill.

Claims: The Deci.Point Slide Rule is the first one to place the decimal point in over 300 years of slide rule history. It not only places the decimal point "mechanically" for the result, but for the square root, cube root and logarithm of the result, which are all obtained at the same time.

The revolutionary arrangement of scales simplifies computation so that persons with limited mathematical knowledge can solve intricate or difficult calculations.

Dowmetal is used in the construction of the rule, which makes it particularly valuable under conditions of grease, heat and humidity.

New Pioneer Plant

Manufacturer: Pioneer Engineering Works, Minneapolis 13, Minn.

Claims: The 46-VE, first in a new line of portable semi-electric powered duplex crushing and screening plants, has the screen and conveyors driven by electric motors from power supplied by a diesel-electric plant. The roll crusher is driven by V-belts from the jaw crusher, which in turn is driven by a flat belt to the diesel motor. A clutch provides for starting and stopping the crusher without interrupting the diesel drive to the generator.

The plant is mounted on a main truck supported on three axles with an equalizer between the two rear axles. Pneumatic tires are standard equipment.

Maloney Boulder Buster

Manufacturer: Universal Pneumatic Tool Co., St. Louis 1, Mo.

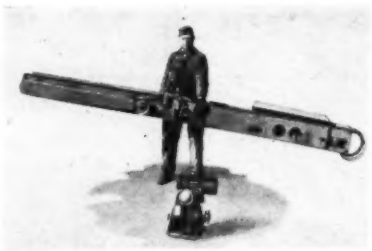
Claims: A safe, quick, noiseless way to break rock, concrete or coal by mechanical expansion. The instrument is an integral unit of specially treated steel operating in movable slides which expand in parallel lines contacting the inner surface of the drilled hole, resulting in an immediate breakage. It is also possible to control the direction of breakage by placing the tool in the drilled hole so that the opening between the two slides points in the direction of the required break. Furthermore the break is comparatively clean, which eliminates the disadvantage of small rock caused by the use of explosives.

The Buster is used by placing it in a six-inch drilled hole in concrete, coal or frozen ground and then driving it down with either pneumatic hammer or sledge—the expansion of the two slides in the drilled hole, as the upper part of the Buster is driven down, causes the break.

Lightweight Conveyor

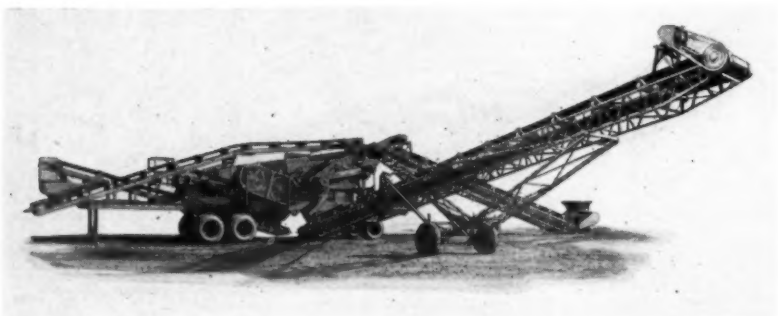
Manufacturer: Material Movement Industries, Chicago 4, Ill.

Claims: New lightweight portable conveyor, the Tote-All Zephyr, is made of special alloy steel and is corrosion and abrasion resistant. At the present time, two lengths are available—12 ft. and 16 ft. Both models have an 8-inch belt, the 12-ft. model weighing only 135 lbs. (without motor). Power is furnished by a gasoline engine which is mounted above the conveyor, out of the way of dust, dirt and spillage. The engine mounting is adjustable to keep engine level at all conveyor



positions, though the conveyor can be purchased without the power unit if so desired.

The unit may be used for conveying many types of bulk products such as sand, salt, coal, gravel, fertilizer, etc.



Crane Remote Control

Manufacturer: Harnischfeger Corporation, Milwaukee 14, Wis.

Claims: Now available on P&H Truck Cranes, this new remote control enables one to operate the crane and the carrier from the crane operator seat. With a simple control panel located in the crane cab, the operator can start the carrier engine, operate the clutch, shift gears, steer the truck, blow the horn and apply the brakes without moving from the crane cab. A center pin is used to connect the panel with solenoid air valves which control the outlet of compressed air needed to operate the various carrier movements.

Precision Subgrader

Manufacturer: Blaw-Knox Company, Pittsburgh, Pa.

Claims: This machine employs an entirely different new principle of cutting the subgrade for paving

construction to the exact elevation and shape required by the specifications. The precision subgrader leaves the subgrade as firmly compacted as the original prepared grade, and thus eliminates the need for subsequent compacting of the subgrade by rolling.

Flexibility of operation is one of the characteristics of the new machine. It will be available in widths adjustable for half-width and full-width paving operations, very similar to the adjustable widths now obtainable in the Blaw-Knox paving spreader and the Blaw-Knox finishing machine. The capacity of the precision subgrader in completed subgrade will keep pace with the accelerated rate of modern paving production.

Transparent Waterproofing

Manufacturer: National Hydrozo Company, Cleveland, Ohio

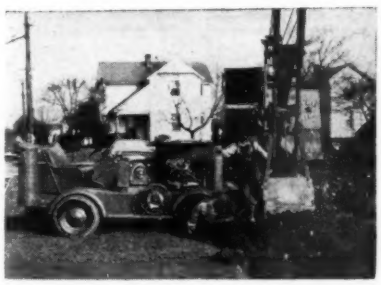
Claims: A mineral preservative, named "Hydrozo" that is not affected after application by atmospheric conditions is now ready for nation-wide distribution. Capable of penetrating completely when brushed or sprayed on, it permanently waterproofs concrete, brick, stone, tile, stucco, wood and many other types of surfaces, making them free from dampness, seepage, deterioration, alkali, efflorescence or acid.

The liquid, having the consistency of turpentine, is colorless though paste colors may be added when color is desired. The waterproofing may be obtained in gallon containers, 5-gal. cans, and in drums of 30 to 55 gals. each.

"Mobile" Arc Welder

Manufacturer: The Hobart Brothers Co., Troy, Ohio

Claims: Latest model of the Hobart line of self-propelled arc



welders, the "Mobile" type was originated to simplify welding operations in various yards of railway companies but has since been put to use for maintenance welding operations around oil refineries, steel mills, quarries, gravel pits, and other industrial jobs.

Welding equipment consists of a 300 ampere welding generator and tank carriers for ox-acetylene welding, and the unit is powered by a Chrysler Industrial 6-cylinder engine for welding and transportation.

Adjustable, Plastic T-Square

Manufacturer: C-Thru Ruler Company, 385 Capitol Ave., Hartford, Conn.

Claims: A new all-plastic adjustable T-Square molded of heavy, colorful plastic with a protractor feature graduated in degrees. The arm of the T-Square allows clear visibility over the entire surface and is fastened to the head in such manner as to allow it to pivot to any angle. The arm is also equipped with brass lugs to permit ink ruling. Another feature is the interchangeability of the arms, available in such lengths as 12, 18, 24 and 30 inches.

Gun-loader Fitting

Manufacturer: Stewart-Warner Corporation, Chicago, Ill.

Claims: The Alemite Division announces new equipment for the loading of hand guns for pressure lubrication systems. The "gun-loader fitting" is mounted on the head of the hand gun and permits grease to flow in to the grease reservoir of the gun in the same manner that it flows into a bearing through a lubrication fitting in normal lubrication. A loader valve mounted on a bucket pump or loader pump, functioning in the same manner that a coupler does when applied to a fitting is the companion item to the loader fitting.

In addition to the new guns and pumps, a loader valve, No. G-306740, to convert present guns to loader operation is available. It can be installed in either lever type or push guns simply by drilling and tapping the 1/8-inch pipe thread.

Manganese Dippers

Manufacturer: American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill.

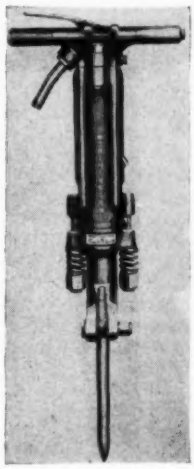
Claims: The Amsco All-Manganese Steel Welded Type Dipper has the advantage of having a manganese steel body welded into an operating unit. Over-lapping, rabbeted joints leave grooves for a welded bead. The parts are fitted together with round plugs, around which weld metal is deposited. Consequently the body of the dipper is as strong and homogeneous as if made in one piece. At the same time it is possible to remove a worn front and reweld in place a new one without destroying the back.

The dipper is made in capacities of 3/4 cu. yd. and up. Sizes 3/4 cu. yd. to 2 cu. yds. are made in two body pieces, front and back. Sizes over 2 cu. yds. are made in four pieces; front, back and two side plates.

Paving Breaker

Manufacturer: Worthington Pump and Machinery Corp., Harrison, N. J.

Claims: An addition to the Worthington line of contractor air tools, the WB-81 Blue Brute Breaker has a new design that includes positive action, end-seating, automatic valve not affected by wear, a large capacity built-in lubricator, a fully cushioned piston, and other notable features. Forgings and alloys are used for all major parts, and all component parts are carefully heat-treated.



Cushion Idler

Manufacturer: Chain Belt Co., Milwaukee 4, Wis.

Claims: A newly designed impact cushioning troughing idler for belt conveyors with each roll consisting of a rubber cylinder vulcanized directly to the assembly tube. The cylinder has multiple grooves moulded into it for maximum cushioning to guard against belt carcass rupture and to provide surface softness for protection against belt cover laceration.

For all loading conditions, the cushion idler should be used to support the belt directly under the loading point.

Shots from the FIRING LINE

Reclamation Bureau Gets Record Appropriation

An appropriation of $113,610,803 for the Bureau of Reclamation in fiscal year 1947—the largest annual appropriation ever made for this Federal agency in its 44-year history — will become available through signature by the President of the Interior Department Appropriation Act, Commissioner Michael W. Straus announced.

The 1947 appropriation, although topping that of other years, falls $53,476,652 short of the Budget estimate submitted by the President for river-resource development in the 17 Western States, as the development program for the West—arrested during the war years—is resumed.

Irrigation and multiple-purpose projects on which the Bureau is resuming construction interrupted by the war will cost more than a billion and a half dollars to complete. These include such tremendous and continuing developments as the Central Valley project (California); the Columbia Basin project (Washington), and initial authorized units in the Missouri River Basin plan that covers all or parts of ten states.

In addition to construction work on 28 major authorized projects, many of which offer settlement opportunities on irrigated farms for veterans and others, Bureau engineers are completing investigations and reports for conservation and use of land and water resources in 20 western river basins. The appropriation for these general investigations was cut from the President's original estimate of $11,000,000 to $5,000,000.

While the Congress appropriates funds for designing and building dams, power plants, and other water conservation facilities in the arid and semiarid West, these costs do not all come out of the taxpayers' pocket. A large part of them is repaid over a period of years to the Federal Treasury by water and power users.

The cost of irrigation facilities actually in operation at the end of 1945 was about $325,000,000, of which more than $75,000,000 has already been repaid by the water users under Reclamation Law. Revenues received from the sale of hydroelectric power at Boulder Dam, Grand Coulee Dam, and other power plants operating on Reclamation projects not only defray the total cost of power features as required by law, but aid in repayment of irrigation construction costs. In 1945, electric energy sales from Bureau developments were approximately $21,000,000.

It has been estimated that the accumulated gross crop value (1906-1945) totaling $4,400,000,000 from 4 million acres of Bureau-watered lands is over 13 times the cost of the irrigation works. The 1945 gross crop value alone was approximately $425,000,000 or $100,000,000 more than the total cost of irrigation facilities now in operation.

A summary by states of Reclamation appropriations for 1947 follows:

BUREAU OF RECLAMATION

Appropriations for Fiscal Year 1947
Construction Funds by States and Projects, Remaining Funds by Purpose

State and Project or Purpose	Budget Estimate 1947	As Reported to House	As Reported to Senate	Public Law No. 478 79th Cong.—2d Session
CONSTRUCTION TOTAL[1]	$123,814,800	$52,085,355	$126,445,208	$84,287,368
Arizona—total:	17,075,000	7,421,280	18,575,000	9,575,000
Gila	2,000,000	867,210	3,500,000	2,000,000
Davis Dam (Ariz.-Nev.)	15,000,000	6,504,070	15,000,000	7,500,000
Colorado River Front Work & Levee System (Ariz.-Calif.)	75,000	50,000	75,000	75,000
California—total:	30,700,000	13,224,945	28,036,670	17,785,622
Central Valley	25,000,000	10,840,120	20,836,670	12,685,622
Kings River	200,000	—	200,000	100,000
All American Canal (Ariz.-Calif.)	5,500,000	2,384,825	7,000,000	5,000,000
Colorado—total:	17,800,000	7,154,485	14,950,410	9,454,485
San Luis	1,500,000	650,410	650,410	650,410
Colorado-Big Thompson	15,000,000	6,504,075	13,000,000	7,504,075
Mancos (WCU)	1,300,000	—	1,300,000	1,300,000
Idaho—total:	7,920,000	3,434,150	8,129,659	5,667,544
Boise, Payette division	2,537,000	1,115,660	2,782,659	2,782,659
Boise, Anderson Ranch	2,847,000	1,234,475	2,847,000	1,234,475
Minidoka	1,000,000	433,605	1,000,000	1,000,000
Palisades	1,500,000	650,410	1,500,000	650,410
Montana—total:	3,096,000	1,342,440	3,096,000	1,841,728
Sun River	96,000	41,625	96,000	41,625
Hungry Horse	2,000,000	867,210	2,000,000	867,210
Fort Peck	1,000,000	433,605	1,000,000	932,893
Nevada—total:	1,000,000	433,605	1,000,000	433,605
Boulder Canyon (Ariz.-Nev.)	1,000,000	433,605	1,000,000	433,605
New Mexico—total:	2,569,800	1,114,280	2,569,800	2,098,675
Rio Grande (N. Mex.-Tex.)	831,800	360,675	831,800	360,675
Tucumcari	1,738,000	753,605	1,738,000	1,738,000
Oklahoma—total:	2,080,000	901,900	2,664,610	2,664,610
Lugert-Altus	2,080,000	901,900	2,664,610	2,664,610
Oregon—total:	1,925,000	780,485	3,123,442	3,123,442
Deschutes	1,300,000	563,685	1,716,837	1,716,837
Owyhee (Oreg.-Idaho)	120,000	[2]	125,000	125,000
Klamath (Oreg.-Calif.)	500,000	216,800	1,281,605	1,281,605
Texas—total:	68,400	[2]	68,400	68,400
Colorado River	68,400	[2]	68,400	68,400
Utah—total:	3,164,000	1,371,925	4,664,000	1,407,040
Provo River	3,102,000	1,345,040	4,602,000	1,345,040
Ogden River	62,000	26,885	62,000	62,000
Washington—total:	31,440,600	13,632,795	29,997,100	20,597,100
Yakima, Roza Division	1,440,600	624,650	2,597,100	2,597,100
Columbia Basin	30,000,000	13,008,145	27,400,000	18,000,000
Wyoming—total:	4,976,000	1,273,065	9,570,117	9,570,117
Kendrick	500,000	216,800	1,895,000	1,895,000
Riverton	1,500,000	650,410	3,520,550	3,520,550
Shoshone, Heart Mountain	800,000	346,885	1,917,672	1,917,672
Shoshone, Willwood	136,000	58,970	196,895	196,895
Eden (WCU)	2,040,000	—	2,040,000	2,040,000
Missouri River Basin[3]	23,908,600	10,312,685	25,582,202	17,500,000
Operation and Maintenance:				---
Authorized from power revenues	3,439,945	3,137,445	3,137,445	3,137,445
Appropriated funds[4]	2,489,055	2,323,435	2,323,435	2,323,435
Salaries and Expenses	5,500,000	4,000,000	5,500,000	4,000,000
General Investigations[4]	11,500,000	3,550,000	11,500,000	5,500,000
Total Direct Appropriations	167,212,455	72,271,475	171,350,845	113,610,803
Total Authorized from Power Revenues	3,439,945	3,137,445	3,137,445	3,137,455

[1] Excludes appropriations for construction in the Missouri River Basin Development.
[2] Estimate submitted when legislation was introduced in Senate.
[3] Breakdown of construction funds by States is not available. Only breakdown available is of Budget estimate appropriations by purpose and is as follows:

Construction and related work	$18,693,600	
Investigations	2,000,000	(125,000 of this aggregate was submitted when legislation was introduced in Senate.)
Coordination with Corps of Engineers	150,000	
To be allocated among other Departmental units	3,065,000	
Total	23,908,600	

[4] Operation and Maintenance appropriated funds includes appropriations from Reclamation Fund, Colorado River Front Work and Levee System Fund, and Clorado River Dam Fund. General investigations includes Reclamation Fund and Colorado River Development Fund.

More Shots on 494

it's worktime all the time

in keeping 500,000 acres drained

FOR "spot" maintenance work in keeping a 500,000-acre former swampland drained for profitable agriculture, Missouri's Little River Drainage District depends on a Bucyrus-Erie ¾-yard 22-B dragline. Kept working and moving 24 hours a day, this 22-B helps keep 900 miles of drainage ditches and three basins clean, 280 miles of levees built up!

Such "worktime-all-the-time" service is nothing new for the 22-B, for like all Bucyrus-Erie ⅜- to 2½-yard excavators, its design and construction give it what it needs to stand up under three-shift operation day after day, delivering a maximum percentage of actual working time each shift. Quickly made, lasting adjustments, easy accessibility for maintenance and repair, large simple machinery, smooth coordinated cycle, and easy full-feel control head a long list of reasons why you can depend on the 22-B for "worktime-all-the-time".

you make the most of EVERY HOUR with a BUCYRUS-ERIE

72E4

SOUTH MILWAUKEE, WISCONSIN

Pit material used for roadbed treatment and detour road topping was quickly dumped by the Mississippi Wagons in accurate windrows.

A Mississippi Wagon takes on its 10-yard load at the gravel pit, six miles off the highway.

Rolling fast over the long lead-in road, the Wagons averaged better than 20 m. p. h. for each round trip.

★ MISSISSIPPI WAGO

MISSISSIPPI WAGONS
ut Time and Cost of Hauling on Texas Highway Job

THE H. E. WILLIAMS COMPANY, of Waco, Texas, used a fleet of ten Mississippi Wagons for the long-distance hauling of 78,000 yards of pit gravel, in the reconstruction of six miles of Texas Highway No. 6, south of Waco.

Needed for both roadbed treatment and detour road topping, the gravel had to be moved from a pit six miles off the highway, over a haul route averaging 9.5 miles to the dump and 10.5 miles return.

Carrying 10-yard payloads, the ten Mississippi Wagons moved an average of 1,000 yards a day over the rough, rolling haul road. Each Wagon averaged ten 20-mile round trips per 10-hour day, covering each round trip at an average of over 20 m. p. h.

Records of the H. E. Williams Company on this job show a total cost for hauling with Mississippi Wagons of 34.3¢ per yard, or 3.6¢ per yard-mile, including reserves for depreciation, parts and tires.

"This figure," says Mr. Williams, "is very pleasing to us, as it is considerably lower than the best records of hauling equipment previously used by us on similar work. We are also well satisfied with the general performance of our Wagons—their ease of handling, superior flotation on soft ground, and efficient operation both on and off the highway."

The ability of Mississippi Wagons to move yardage fast and cheaply is being demonstrated every day on jobs all over the country. Ask any owner what he thinks of Mississippi Wagons—then ask your nearby distributor for facts and figures on what Mississippi Wagons can do for YOU.

●

M-R-S MANUFACTURING COMPANY
Jackson Mississippi, U. S. A.

When profits depend on low-cost hauling... You can depend on MISSISSIPPI WAGONS!

The World's Most Modern Hauling Unit

• Bucyrus-Erie ½-cu. yd. shovel powered by Caterpillar Diesel engine loading gravel into trucks in gravel pit on E. E. Hood at San Antonio, Texas.

Shots from the Firing Line

(Continued from page 490)

Award Two Contracts on Penn-Lincoln Parkway

Contracts for the construction of two sections of the Penn-Lincoln Parkway, a section of the Lincoln Highway which will largely overpass Pittsburgh which run-offs to more important sections of the city, were awarded to Johnson, Drake & Piper of New York City ($2,042,368) and Dinardo, Inc., of Pittsburgh ($1,005,178).

Johnson, Drake and Piper will build 1.78 miles of highway and six bridges; Dinardo will build .18 miles of road and six bridges. The Federal Roads Agency will put up half the money for the project which will total $35,000,000 before it's finished.

Plans for the first section of the highway call for nearly one million cu. yds. of grading. There will be no grade intersections, all connections being taken care of by interchanges. Years of study and planning have produced blueprints for one of the most modern highways ever attempted on rugged, hilly terrain.

The Penn-Lincoln Parkway will include: 960 feet of divided highway consisting of reinforced cement concrete pavement 24 feet in width on each side of a divisor area; one steel arch bridge and one reinforced concrete bridge. Also there will be 9,180 feet of divided highway consisting of reinforced concrete pavement, 24 feet wide on each side of a divisor area, including two plate girder bridges, one continuous I-beam bridge and two reinforced concrete arches; 11,979 feet of reinforced concrete pavement variable from 14 feet to 30 feet, six inches in width, including one reinforced concrete bridge on ramps intersecting with Route 763.

Propose Super Toll Road To Run Through Ohio

Construction of a toll-financed $100,000,000 Ohio highspeed superhighway, longer than and connecting with the famous Pennsylvania Turnpike, is proposed by State Senator Ralph Winter.

Senator Winter announced he will introduce a bill in the 1947 Ohio Legislature providing for the creation of a commission to study the proposal, to issue bonds if found feasible and to begin construction. No state funds will be asked except for commission expenses.

The superhighway would be 231 miles long, and while no definite route has been decided, it would be aimed toward Chicago, probably entering a point between East Liverpool and Youngstown.

It would detour around all towns and there would be only 15 or 17 points where it could be entered. It would run generally toward Akron and Cleveland between Lorain and Elyria south of Sandusky and Toledo. Underpasses would eliminate all crossroads.

Senator Winter disclosed that preliminary studies for such a highway already were being made by Major H. H. Allen, consulting engineer for the Pennsylvania Turnpike. Major Allen is receiving no pay for his work, it was said.

Pennsylvania, according to Senator Winter, has given assurance that its 165-mile superhighway which now ends at Irwin, east of Pittsburgh, would be

(Continued on page 498)

The BEST COSTS LESS

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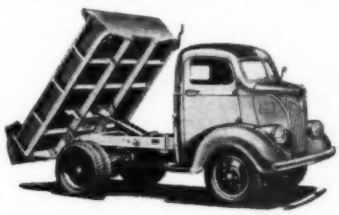
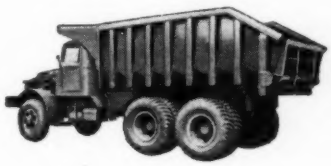
For years Gar Wood has consistently offered truck and trailer equipment of utmost utility and outstanding value. Leadership in this field resulted from this policy. Gar Wood equipment costs less in the long run because it is better built to give peak performance and lasting satisfaction.

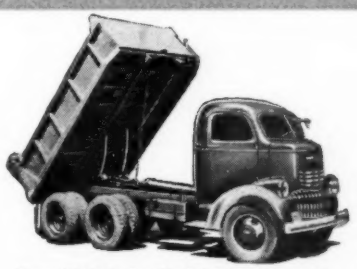


Type C12 Body and Model D6 or D7 Hoist. Dumping angle 55°.



Type X-112 Extra heavy duty Body with automatic downfolding tailgate.

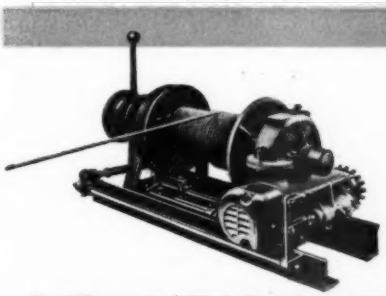
Special rock Body, scoop type rear end. Model F4CA cam and roller Hoist.



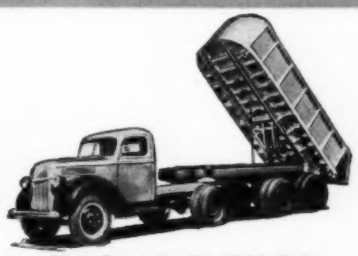
Type W12 Body. Model F4C cam and roller Hoist. Capacity 6 cu. yds.

Type X-112 Extra heavy duty Body, scoop end, with Model T-4440 Hoist. Capacity 19 cu. yds.

Type W12 Body, front recessed for Model TV83 Hoist. Capacity 15 cu. yds.



Rapid Reverse truck Winch. Single lever control. Capacities 15,000 to 60,000 pounds line pull.



West Coast Special W-12 Body, Model F8C cam and roller Hoist. Capacity 10 cu. yds.

Telescopic boom Crane. Radius 8 to 20 feet.

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You'll Get the Best with INTERNATIONAL

When you buy dirt-moving *power* and *equipment* from your International Industrial Power Distributor, you get this unbeatable combination:

INTERNATIONAL TRACTORS — built by *specialists* in engine and tractor design.

MATCHED EQUIPMENT — built by *specialists* in earth-moving machines and developed through close cooperation with International Harvester engineers.

International tractor and equipment combinations are balanced units that move dirt efficiently, at lowest possible cost. They are exactly suited to your locations and the requirements of your jobs.

The tractors and engines are built to standards nowhere else excelled! Investigate their features of design and performance and you'll agree that Internationals can't be beat!

The matched equipment is equally outstanding, built by *specialists* who know the dirt-moving business from A to Z, through long experience in competing successfully for the earth-moving market. This assures the production of the best possible equipment for International Tractors and Power Units.

POWER UNITS

WHEEL TRACTORS

CRAWLER TRACTORS

INTERNATIONAL HARVESTER

In addition, the service facilities of International Industrial Power Distributors are unexcelled. Wherever you go there's a thoroughly equipped, factory-trained service organization near you to keep your tractors and equipment in first-class working order.

Yes sir! Here is the *best combination:* International Tractors, Matched Equipment and the nation-wide service facilities of International Industrial Power Distributors.

The distributor near you will give you further information about the tractors, power units and equipment now available—and about the facilities he provides for factory-level service—whenever you want it.

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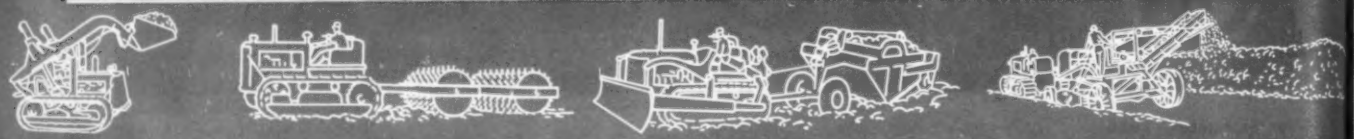

4 sizes of INTERNATIONAL Diesel Crawler Tractors are currently available through International Distributors who also supply allied equipment matched to each.

Shots from the Firing Line

(Continued from page 494)

extended to Ohio if Ohio approves a similar highway.

An Ohio Turnpike Commission, which would be created by Senator Winter's proposed legislation, would consist of five or more members to be appointed by the governor, with the state highway director serving as an ex-officio member. The commission would be authorized to issue revenue to be amortized by toll collections. Senator Winter estimates the highway could be completely paid for in 25 to 30 years. It would cost about $400,000 a mile, or a total of $92,400,000 and would carry the bulk of the traffic from Chicago east.

"The Youngstown-Cleveland-Ashtabula triangle was found during the war to be one of the worst traffic bottlenecks in the nation," Senator Winter said. "That was brought out by the War Department. The turnpike would eliminate this bottleneck."

Pointing out that the new highway also would leave "the state more money for improvement of present highways," he further declared that "trucks which now crowd our highways would welcome the superhighway, making it safer for the flood of private automobiles expected within a few years."

Senator Winter said it would take years to construct a four-lane divided highway system with railroad overpasses and limited access for regular roads under the federal plans for matching $60,000,000 in state funds with a like amount over a three-year period.

"If Ohio could help create a superhighway linking the Pennsylvania turnpike with Chicago, it ought to get busy and make it possible," he asserted.

Senator Winter said that Ohio firms already have agreed to underwrite the financing of a toll superhighway because of the profitable showing by the Pennsylvania Turnpike, even during gasoline rationing. Prospective purchasers of large blocks of bonds, he said, already had engaged the J. H. Greiner Co. of Baltimore for a preliminary survey to determine the best location for an Ohio turnpike.

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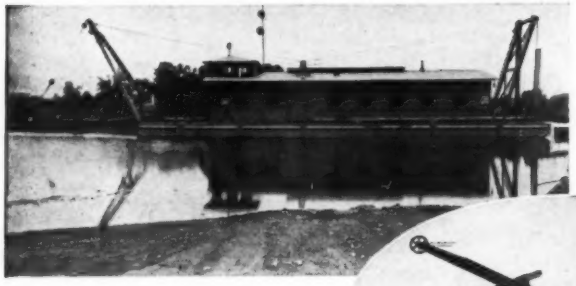

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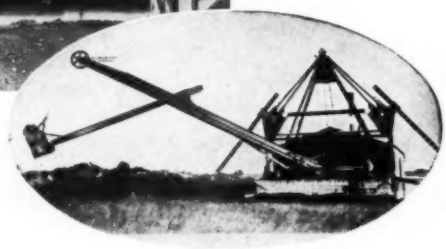
Sizes 8" to 15"



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Highway Prospects Brighter for 1946

Despite shortages of material, labor, equipment, steel and engineers, postwar highway construction to repair the nation's war deteriorated roads and build new ones now totals $400 million, Charles M. Upham, engineer-director of the American Road Builders' Association, said.

Estimated state and federal-aid programs to be placed under construction this year will bring the total to $715 million, Upham said. This will top the government's estimate of $500 million for road building in 1946 and, with some of the bottlenecks removed in coming months, a marked increase in highway construction can be safely predicted for 1947, the association's executive pointed out.

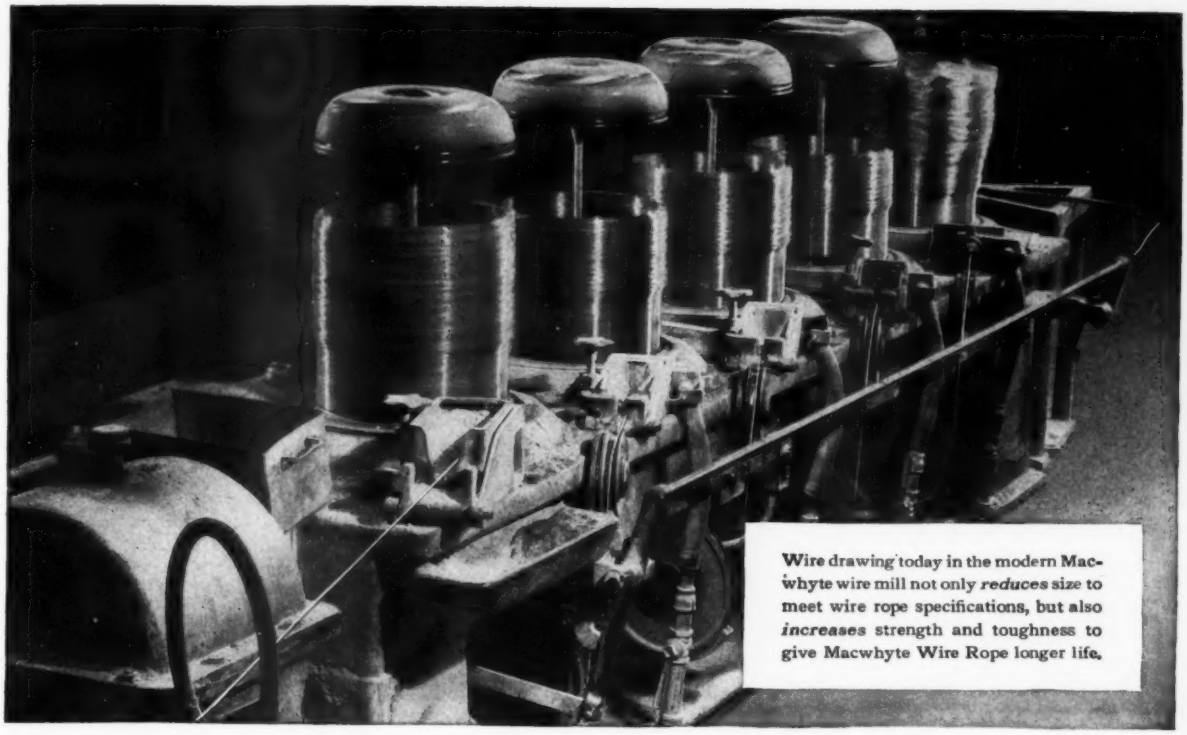
Mr. Upham's figures are based on returns from 33 states and the District of Columbia in a nation-wide survey of highway conditions the American Road Builders' Association is making.

"It is a heartening view of a transportation condition which the war unavoidably made extremely difficult," Upham said.

Pennsylvania leads with a road program of $39 million underway, according to the ARBA survey. Of this $35 million will be completed in 1946. California comes next with $32 million actually being built and an estimated total of $75 million for the year. California's program, one of the most ambitious ever attempted called for an award rate of $2 million a week. While this schedule has not been met, a large amount of work is going on. New York is third on the list of states reporting with $30 million under construction. Texas is close up with $28 million under way and an estimated $65 million for the year.

"We believe these partial returns indicate that while the construction program is not yet in high gear, it is ready to go forward rapidly once economic difficulties abate," Upham said.

"On the other hand," he warned, "neither one year nor several years of road building will solve this country's road needs. Our highway construction sights must be raised. Year after year of sus-



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You get a better, longer lasting Macwhyte Wire Rope, because we cold-draw rope wire from heat-treated wire rods.

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tained road building is an absolute necessity.

"Only 49 per cent of the nation's 1,928,000 miles of county and local roads have all-weather surfaces. Only 73 per cent of the 304,000 miles of municipal streets and alleys have surfaces of concrete, asphalt, tar coating, gravel or stabilized earth. Even in the better cared for state controlled highways, 17 per cent of the 563,520 miles still lack such surfacing.

"The tremendous need of an adequate program for repairing war-casualty roads and for building necessary new ones of modern design stands out in figures of traffic accidents," Upham said. "Our economic loss from traffic accidents totals three times the cost of our road building program. Yet it has been expertly estimated on the basis of careful surveys that the safety factor of modern road design could reduce traffic accidents by nearly 80 per cent in a modernized system of national highways."

Authorize U. S. Agencies to Build Bridges Across Dams

Federal agencies are now authorized to build needed public highway bridges across dams constructed by them. The authority is granted by Public Law 562, approved on July 29.

Determination that a bridge across a dam is economically desirable and needed as a link in the State or Federal-aid highway systems must be made jointly by the Public Roads Administration and the State highway department concerned. The Federal agency having jurisdiction over the dam will be responsible both for the design and construction required to enable the dam to support a bridge, and for the design and construction of the bridge itself; but in planning the highway features of the bridge the standards and advice of Public Roads Administration are to be followed.

The State or one of its subdivisions will be required to build and maintain the bridge approaches and any necessary connecting roads. An agreement to that effect must be entered into by the State or its subdivision with Public Roads and with the agency controlling the dam, before construction of the bridge can be undertaken. The agency concerned may convey without cost to the State or its subdivision any lands, rights-of-way, or easements of the Federal Government which are under its control and are needed for proper location of the approach roads. Federal-aid funds may be used on eligible approach road projects.

The added design and construction costs of the dam and the entire cost of the bridge itself are to be paid wholly from Federal funds. The Commissioner of Public Roads may also determine that portions of the bridge extending beyond the structure of the dam are to be so financed. Such extensions will be constructed and maintained by the dam-building agency.

A $10,000,000 fund is made available for expenditure by Public Roads Administration to reimburse other Federal agencies for work of this nature which they may be called upon to perform. Reimbursement is to be made as needed from available Federal-aid funds and will subsequently be replaced by appropriations which are authorized in the act.

Should a Federal agency construct a bridge across a dam for its own purposes or because of legal obligation to relocate a highway or bridge, the costs will be chargeable to the agency itself rather than to the special fund.

The legislation will aid in future development of road systems. It is not expected that construction of bridges across dams will begin during the period that Federal construction activity is curtailed.

Bashore U. S. Representative In Compact Negotiations

Harry W. Bashore, former Commissioner of Reclamation, designated by President Truman as United States representative in Upper Colorado River Basin Interstate Compact negotiations at Cheyenne, Wyoming, was recommended by Secretary of the Interior J. A. Krug.

Appointment of a Federal representative in the compact negotiations for di-

General Purpose, Wide Rehandling, Heavy Duty Digging Types, ⅜ to 2½ Yard Sizes.

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Johnson adds extra strength at every point of wear. Modern welded construction eliminates weight of rivets and tie plates. Just that much extra steel reinforces the lips, sides and bottoms of every Johnson All-Welded Bucket.

Heavy lips, sides and bottoms lower the center of gravity. Maximum weight close to the teeth gets maximum penetration, bigger bites. Because bucket balance is improved, Johnson Buckets hit the dirt standing up, bite in with both sets of teeth. Because obstructing bolts and rivet heads are out, their slick, smooth clams dump fast. Even sticky materials slide right out.

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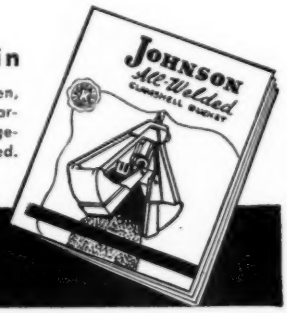
Full story on these additional advantages: Keen, hard manganese lip edges . . . needle bearings on closing sheaves . . . clams interchangeable . . . lower sheaves completely protected.



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Today's Thermoid Air Hose is tough. It stands up to flexing, pulsation-frequencies, pressures, hard knocks and abrasion that would quickly destroy the best air hose of a few years ago.

Thermoid's improvements in air hose should interest you, for they are typical of the way we contribute to industrial progress. Through the years Thermoid has matched the ingenuity of engineers and inventors. Making available constantly improved industrial rubber products, we have helped them translate their ideas and blue-prints into equipment able to perform faster and more efficiently.

Consult your Thermoid Representative about your problems. Like so many, you may find, "It's Good Business to Do Business with Thermoid."

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vision of the waters of the upper Colorado River was requested by Governors Lester C. Hunt (Wyo.), Herbert B. Maw (Utah), Sidney P. Osborne (Ariz), and John C. Vivian (Colo.).

As Federal representative, Bashore will participate in the negotiations and report to the Congress on the proceedings and the compact agreed upon.

The proposed Colorado River Basin Report recently released by the Department of the Interior inventories potential irrigation projects for development in the Colorado River Basin. Recommendation for construction of the projects was withheld pending allocation of water among the states involved.

Commissioner Straus, commenting on the appointment, said that Bashore had established an outstanding record in his long service in all branches of the Bureau, and cited the fact that Bashore was personally familiar with the involved interstate compact on Colorado River waters and had himself investigated and built many of the Reclamation projects in the upper Colorado Basin.

White River Constructors Get Bull Shoals Dam Job

White River Constructors of Houston, Texas, a combine of seven companies, was awarded a contract for $24,263,935 to build the Bull Shoals dam, about 10 miles west of Mountain Home, Ark. Contract calls for the entire job to be completed within 1,150 days.

The following firms combined to form the White River Constructors: Johnson Construction Company, David A. Gordon, Condon - Cunningham Company, Winston Brothers Company, Pete Kiewitt Sons Company, Brown and Root, Inc., and Wunderlich Contractor Co.

Man-hours on the construction of the dam and reservoir is expected to run around 22,000,000, at the site, and offsite man-hours needed will run around 21,000,000. Bull Shoals dam will be the fifth largest concrete dam in the United States.

This is expected to be one of the largest excavation jobs in this section of the country, and will consist of 450,000 cu. yds. of rock excavation and more than 400,000 cu. yds. of common excavation.

The Bull Shoals dam is the key project for developing the upper and lower regions of the White River Country, in both Arkansas and Missouri, which is only about 15 miles from the dam site.

A.E.D. Regional Conferences Scheduled for September

Five of the Associated Equipment Distributors' 15 geographical regions have set dates in September for their Fall regional meetings to discuss such matters of vital concern to the construction machinery industry as surplus property disposal, CPA, and OPA regulations, and various methods of business administration.

A.E.D.'s Executive Committee will hold its Fall meeting at Sonoma, Calif., October 6, 7, and 8, with Frank B. McBath, president, of Portland, Oregon, presiding. This meeting, attended by members of the Association's Executive Committee, all A.E.D. officers, the chairman of the advisory board, and members of the finance committee, will, as part of the agenda, take stock of the surplus property situation existing at that time in the light of administration of the Surplus Property Act since June when A.E.D.'s board of directors adopted a resolution describing it as "proving to be an ineffectual and time-consuming means for disposing of surplus personal property of the government in getting it into the hands of consumers."

Following the Executive Committee meeting at Sonoma, the members in Region 11, from the states of California, Arizona, and Nevada, will hold a Fall meeting at the same point with A. F. Garlinghouse of Los Angeles, director of that region, presiding.

On September 10, Region 1 will hold its meeting at Providence, Rhode Island, with W. A. Danner of Hyde Park, Mass., director, and executive vice-president of A.E.D. presiding.

Region 3 will hold its meeting at the Penn Harris Hotel, Harrisburg, Pa., on September 12, with George N. Crawford of Pittsburgh, presiding as director of the region.

Region 4 will meet in the George

(Continued on page 506)

On long hauls and short — on mountain roads and city traffic— on heavy and light equipment—all over America GATKE *CUSTOM-BILT* Brake Blocks and Liners are increasing efficiency and reducing maintenance for Fleet Operators.

The *smooth, non-grabbing* action prolongs tire life and reduces strain on equipment.

Correct frictional balance, with no loss of efficiency on long grades.

Long wear life for better mileage with fewer adjustments.

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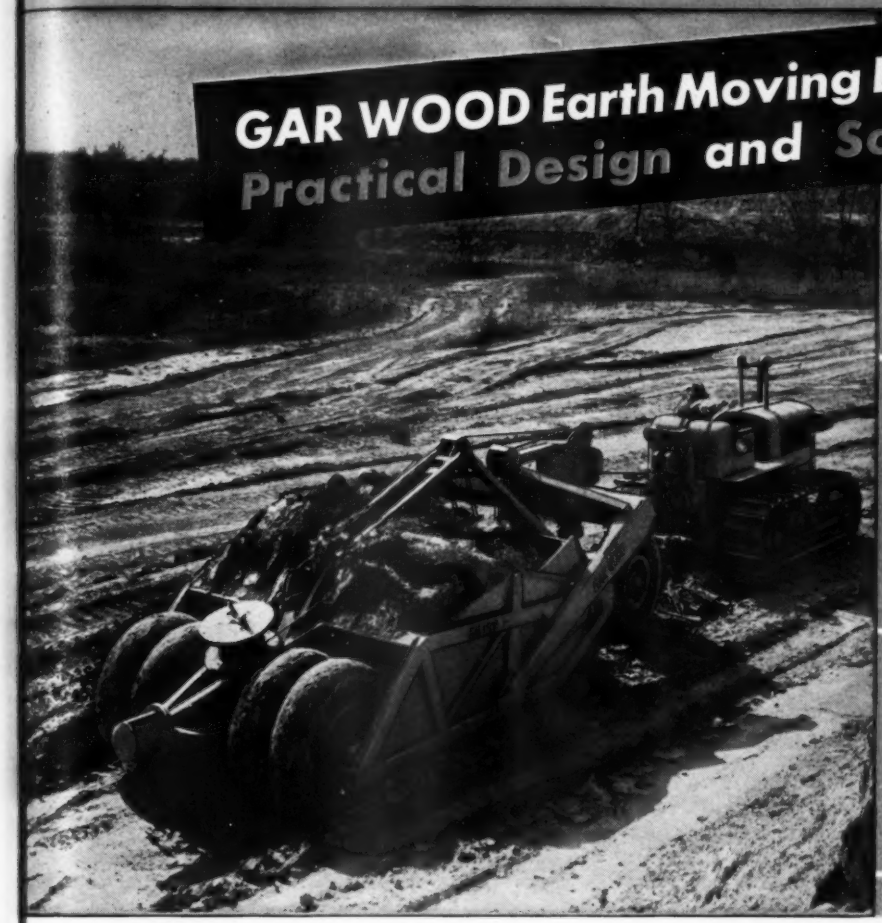
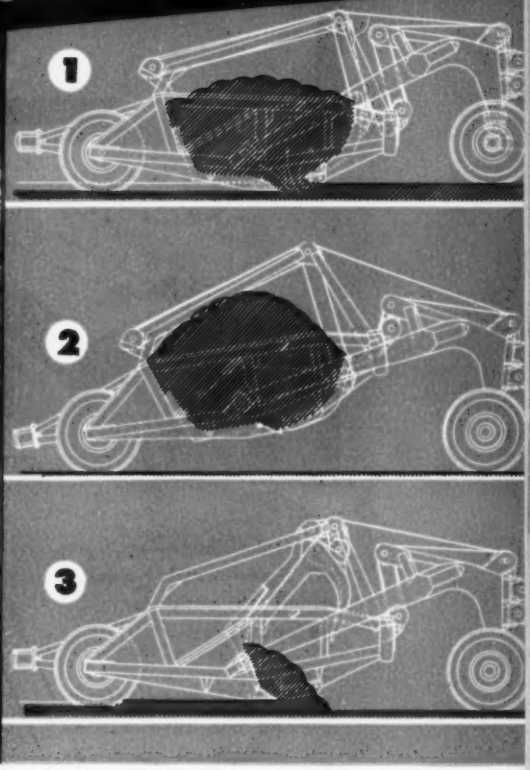
Practical Design and Sound Construction





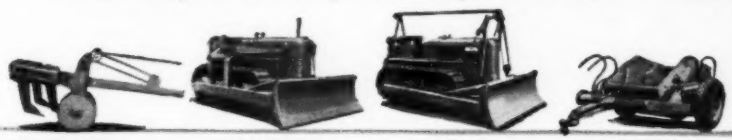
GAR WOOD 4-Wheel Cable Scrapers are *all scraper*, well engineered, honestly built of high quality materials, developed and proved over a period of many years—scrapers that *hold together* and get big yardage jobs done at consistently good speed with an absolute minimum of down time. Some of the many outstanding engineering features, as well as the rugged simplicity of the mechanism, are shown in the three drawings above:

1. LOADING: The self-loading is by positive digging to depths down to 12". "Boiling" action of dirt loads bowl and patented apron evenly by reason of proper angle of the cutting edge. Positive digging action is assured in all types of materials by proper location of draft point.

2. CARRYING: This position provides extremely high clearance of cutting edge, essential in traveling over uneven ground and in discharging sticky materials. Proper weight distribution with exceptionally low center of gravity assures stability—provides for maximum tire life.

3. DUMPING AND SPREADING: The first portion of the load dumps automatically when the apron is raised. The remainder is forced out by *positive rolling ejection.* Note extremely large apron opening to facilitate this ejection of all types of materials. Cutting edge remains stationary throughout cycle, providing for even, *accurate control* of the spread by the heavy duty *Gar Wood Cable Control Unit.*

Contact your Allis-Chalmers dealer. He will be glad to show you Gar Wood earth moving equipment and arrange for you to see on-the-job performance in your locality.



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Dealers Everywhere

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New KOEHRING Easily Lifts 40,000 lbs.

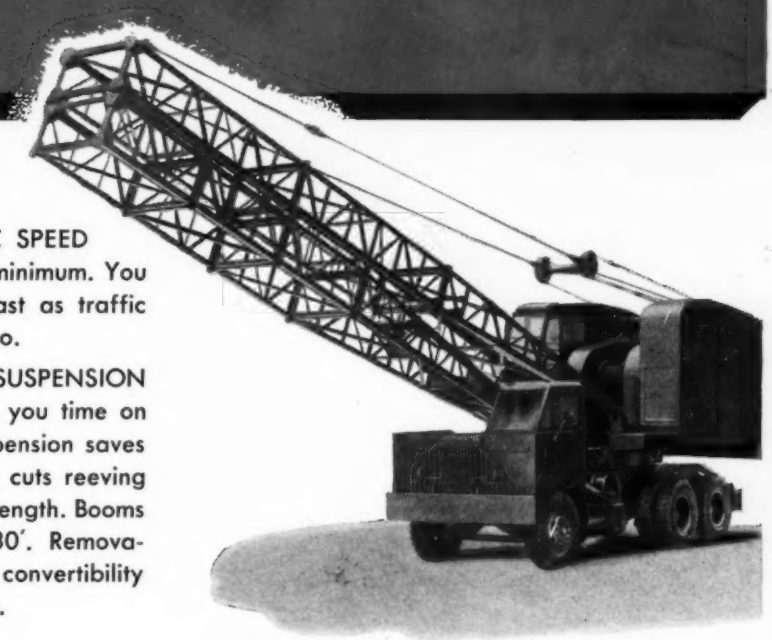
KOEHRING HEAVY DUTY

CHECK the new Koehring 304 Truck Crane, the new Heavy-Duty unit with all the sturdy quality of the Koehring line. The same base machine that makes the Koehring 304 a Heavy-Duty leader in the crawler class is yours on the Koehring 304 Truck Crane. Its extra strength turns added stability gained by truck mounting into extra lifting capacity. With outriggers, you easily lift 40,000 lbs. (85% rating) . . . not only over the end, but over the side and all around. Without outriggers, you lift up to 15,800 lbs.

Excellent visibility—up, front, left, right — makes steel setting jobs easier for the operator.

High lifting capacity gets big pay loads, extra production, in clamshell work.

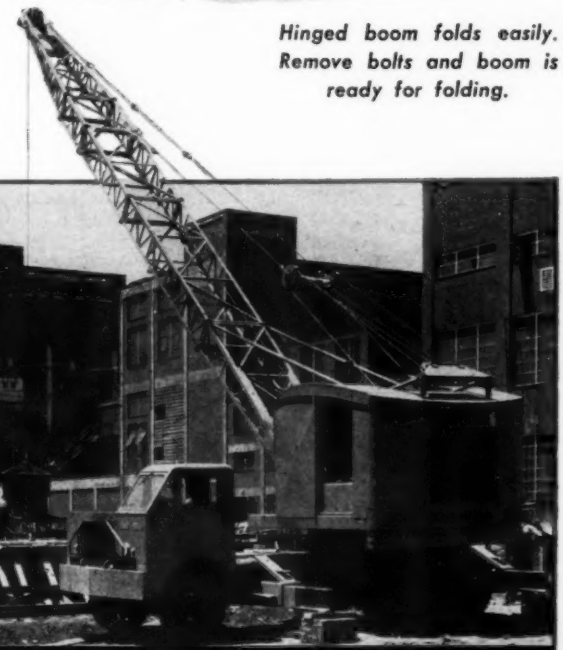
304 TRUCK CRANE
Travels at Traffic Speed



YOU ROLL ALONG AT TRAFFIC SPEED
No-pay travel time drops to the minimum. You roll along from job to job as fast as traffic flows. Where trucks go, you go.

FOLDING BOOM . . . PENDANT SUSPENSION
Hinged boom folds easily, saves you time on every move. Pendant boom suspension saves 60% of boom suspension cable, cuts reeving time whenever you change boom length. Booms up to 110′. Jib extensions 5′ to 30′. Removable outriggers are optional for full convertibility to shovel, pull shovel or dragline.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN
Subsidiaries: **KWIK-MIX • JOHNSON • PARSONS**



Hinged boom folds easily. Remove bolts and boom is ready for folding.

Smooth, accurate brakes and clutches put steel just where you want it.

Pendant boom suspension cuts cable costs, simplifies changes in boom length.

FOR LONGER ROPE LIFE—
WICKWIRE SPENCER
WIRE ROPE
—IN ALL SIZES AND
CONSTRUCTIONS
—FOR EVERY NEED.

Constant, careful control through every step of manufacture assures dependable performance, safety and long life in Wickwire Spencer Wire Rope.

HOW TO PROLONG ROPE LIFE AND LESSEN ROPE COSTS . . .

Thousands of wire rope users—old hands and new—have found "Know Your Ropes" of inestimable value in lengthening life of wire rope. Contains 78 "right and wrong" illustrations, 41 wire rope life savers, 20 diagrams, tables, graphs and charts.

For your FREE copy, write
Wire Rope Sales Office, Palmer, Mass.

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WEST COAST OFFICES OAKLAND 4, CALIFORNIA

Shots from the Firing Line

(Continued from page 502)

Washington Hotel, Ocean City, Maryland, on September 13 and 14, with Robert H. Carter, director, of Richmond, Virginia, presiding.

On September 17 and 18, Region 5 will hold its meeting in the Biltmore Hotel, Atlanta, Georgia. Albert E. Hahnan, AED director of Atlanta, will preside.

The final regional meeting, so far scheduled as to place and date, will be that of Region 6, to be held in the Deshler Hotel, Columbus, Ohio, on September 20. J. C. Williams of Columbus, A.E.D. director, will preside.

President McBath will attend and adress each of these regional meetings, accompanied by Executive Secretary C. F. Winchester.

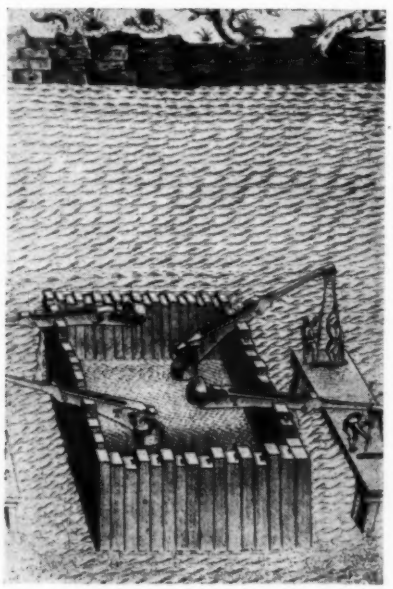
Start Work on New York's New Super-highway

Construction of New York State's $202,000,000 Thruway was inaugurated at a ceremonial ground breaking at Liverpool, N. Y., by Gov. Thomas E. Dewey, who described the projected new superhighway as the Twentieth Century counterpart of the Erie Canal.

A six-lane express superhighway that will be open to both commercial and pleasure traffic, the Thruway will run 486 miles from the southern tip of Rockland County, a short distance from the George Washington Bridge, to the Pennsylvania border at Lake Erie with-

• In the Sixteenth Century, Agostino Ramelli, who served under the Duke of Anjon and distinguished himself as a military engineer, planned this device for dredging river bottoms. Ramelli also designed the first tank and published many suggestions for hydraulic machinery.

The Bettmann Archive



PRODUCING BALLAST *for the* UNION PACIFIC

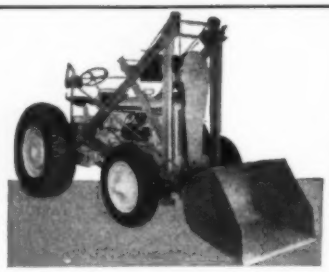
For their large, modern ballast plant at Evanston, Wyoming, the Utah Sand and Gravel Products Corporation replaced a fleet of nine 5 cu. yd. trucks with four Bottom-Dump Euclids of 13 cu. yd. struck measure capacity. This reduced manpower requirements and effected substantial savings in maintenance and operation.

The Euclids are loaded with heavy gravel by a 3 yard shovel for a haul of 1200 ft. with a maximum adverse grade of about five per cent. Over an entire year's operation, these Bottom-Dump Euclids have averaged better than 11 round trips per hour with only minor repairs and normal replacements.

If you want hauling equipment that is designed and built for tough, off-the-highway service . . . that has proved its efficiency, long life and reliable performance and moves more material at lower cost . . . check Rear-Dump and Bottom-Dump Euclids for your requirements.

May we send you literature and specifications?

THE EUCLID ROAD MACHINERY COMPANY
CLEVELAND 17, OHIO



Front - End

LOADERS

For Industrial Tractors

Extensible Booms,
5/8-cu. Yd., Bucket 8-foot lift,
Backfiller Blades

White Mfg. Co.

ELKHART INDIANA

• Iowa Manufacturing Co. Junior Tandem Straightline crushing plant in operation in Door County, Wisconsin. Crushed stone is used for road repair.

out a single highway or railroad intersection at grade or a single traffic light.

Planned by the New York State Department of Public Works as the state's concept of the highway of the future, the Thruway will have many features reminiscent of the "Futurama," the Norman Bel Gedes production that was the main attraction of the General Motors exhibit at the 1939 World's Fair.

A mall of varying width will separate opposing traffic lanes. At turns the mall will be planted with trees to screen the headlights of approaching vehicles at night. Drivers of vehicles using the new highway will have a minimum clear vision for 1,000 feet ahead at all times. The minimum radium of curves will be 2,800 feet and the maximum grade three feet in each 100 feet.

State Public Works Superintendent Charles H. Sells explained that access to the highway will be provided by side roads an average distance of four miles apart. Vehicles entering or leaving will use accelerating and decelerating lanes.

From its starting point in southern Rockland, where it will connect with a similar highway being planned by the State of New Jersey to run to the George Washington Bridge, the new highway will follow the west bank of the Hudson north to a point about 20 miles south of Albany, then swing west through central New York by-passing Utica, Syracuse, Rochester and Buffalo.

It is planned to eventually build connections from the Thruway to New England and to Canada. Also being planned are arterial connections between the Thruway and the cities along its route so as to provide its maximum utilization.

In his address at the ceremonies marking the start of construction, Governor Dewey said of the Thruway: "Its pavement and bridges will be built to carry, with ease and efficiency, the heaviest commercial vehicles and the family car. It will provide a great new artery to connect the agricultural and recreational regions of the state with urban areas. Just as the Erie Canal brought new prosperity to the state a century ago, the Thruway can result in new upswinging our Twentieth Century."

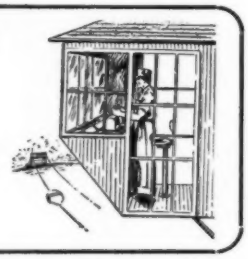
Governor Dewey broke ground for the new project, then took controls of a bulldozer to start the actual grading on a 3.46-mile stretch of the Thruway in Onondaga County. A contract for preliminary grading and structures for this section was awarded to the D. W. Winkleman Co., Inc., and A. S. Wikstrom of Syracuse for a low bid of $593,732.95. A separate contract for similar work on a section of the route through Greene County was let to the Grandview Co. of Mount Vernon.

According to the present schedule the highway will be completed and in use for its full length in five years.

Relocate Highway from Boysen Reservoir Area

Two contracts amounting to $854,789 for relocation of four and one-half miles of U. S. Highway 20, which now crosses the site of the Boysen reservoir of the Missouri Basin project in northern Wyoming, and for the ground work of the

CUT YOUR HANDLING COST
with 1 MAN and a
SAUERMAN SCRAPER



At a large nickel mine in Canada, a Sauerman Scraper makes a deep cut into a hill, hauls the material 400 ft. and dumps through an opening into an empty mine stope. Thus, one man's labor accounts for 2,000 cu. yd. of cut and fill a day. Economies similar to this are effected wherever Sauerman Scrapers are used for dig-and-haul work.

With one man at the controls, a Sauerman Power Scraper or Slackline Cableway digs, hauls, and automatically dumps sand, gravel, earth or bulk material. Simple operation! Small expenditure of power! A Sauerman machine can be installed to reach across a pit, pond, river or stockpile, or up to the top of a hill. It moves material at high speed, anywhere within its wide radius. Flexible for any conditions.

Choice of handling capacities is available, from 10 to 600 cu. yds. per hour. Gas, electric or diesel power.

Send for useful information book based on data supplied by contractors, engineers, gravel producers, mine operators, etc. It's free.

SAUERMAN BROS., INC.

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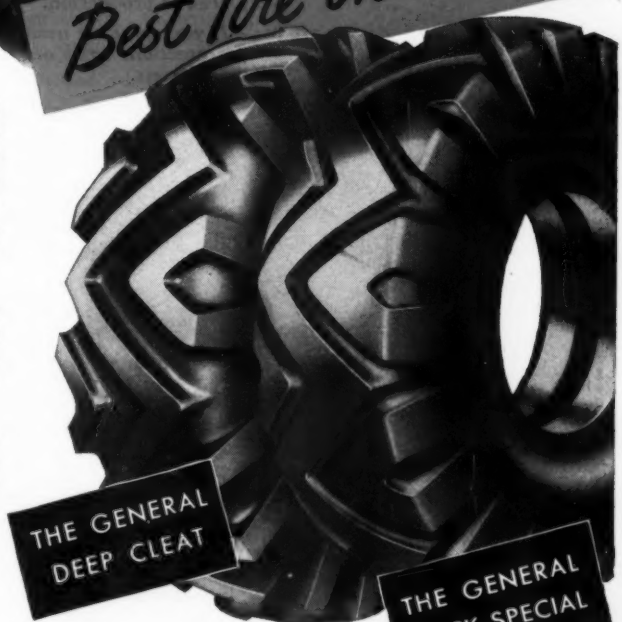
BUILT FOR SERVICE

Built to Last

This Adams Motor Grader is equipped with General Deep Cleat Tires.

Best Tire "on earth"



Yes, General Off-the-road Tires were ALWAYS built for SERVICE. Wartime shortages of natural rubber led to constant research and continuous tests to build a tire comparable to pre-war standards. General's engineers succeeded. They developed "shock-absorber construction" which added life to the tire, made it more rugged, eliminated the common chance of bruises, tears, snags and blowouts.

Now natural rubber is back in greater quantities. More natural rubber plus advances in construction methods worked out in General laboratories mean that General's Off-the-road Tires are as always not only the "best on earth"... they are *better than ever.*

These massive Generals... like all General Tires... are built to top quality. They are the product of skilled craftsmen and *they are built to last.* That is why General Off-the-road Tires... and General Highway Tires as well... are giving the lowest cost performance in tire history.

The GENERAL TIRE

THE GENERAL TIRE & RUBBER CO.
AKRON, OHIO

GENERAL *OFF-THE-ROAD* TIRES

Boysen Government camp have been awarded, according to a report from Secretary of the Interior J. A. Krug.

Commissioner of Reclamation Michael W. Straus said this work is preliminary to the Bureau's construction of the Boysen Dam and power plant on the Big Horn River. The Boysen reservoir will provide 820,000 acre-feet of storage capacity for irrigation, power production, and silt and flood control.

The part of the highway to be relocated is between Bonneville and Boysen in Fremont County, Wyoming. Contract for this work went to Gibbons and Reed Company, Salt Lake City, Utah, on its low bid of $742,407. The contract for work on the construction camp went to Charles M. Smith, Thermopolis, Wyoming, on his low bid of $112,382.

Principal items of work on the highway relocation require more than a million cu. yds. of common and rock excavation, more than 5,500 cu. yds. of compacted backfill, 1,280 cu. yds. of concrete, nearly 4,000 lineal feet of corrugated metal pipe, and 50,000 tons of crusher run gravel and stone chips in the roadway base and in the surfacing. More than 500 tons of liquid asphalt also will be used.

The work on the Government camp involves construction of streets and parking areas, walks, curbs and gutters, and the drainage, sewerage and water distribution systems which includes installation of a 40,000-gallon water tank and a pumping and treating plant.

The camp site is situated about 13 miles north of Bonneville, Wyoming. Ultimately the camp will consist of permanent and temporary residences and bunkhouses for the workers on the dam and reservoir, a garage and warehouse, and an office building.

Commissioner Straus said the Bureau of Reclamation has scheduled construction this year on the Boysen Dam and power plant. The dam will be an earth-fill structure, 155 feet high, and 800 feet long at the top. The power plant will have a capacity of 15,000 kilowatts. The dam and reservoir will desilt the water of the Big Horn River and thus reduce the cost of maintaining the downstream irrigation works. The stored water will also supplement the natural water flow for the irrigation developments along the main stream in Wyoming and Montana and will regulate flood waters. The power is needed to help meet a growing power shortage in the area for agricultural, municipal, and industrial uses.

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DUST REMOVAL EFFICIENCY TEST
With pump providing actual engine air demand, dust is fed into cleaner. If any dust passes cleaner it is caught on filter cloth which can be removed and examined.

Dust and dirt inside an engine, grind like emery between moving parts. To prevent this destructive wear, air cleaners must be as close to 100% efficient as skilled engineering can make them.

To assure you of this efficiency, every new Donaldson Cleaner is subjected to tests like the one shown below, in which all possible field conditions are realistically simulated. Only after passing these severe tests is any Donaldson Cleaner placed in production.

If your product needs this better dust protection, write our engineering department.

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SALES ENGINEERS: Chicago Cleveland Detroit

DONALDSON *Oil-Washed* AIR CLEANERS

Let Contracts on 45 Miles of Canals

Contracts totaling $822,025 for work on 45 miles of canals and a pumping plant that will lift water from the Black Canyon Canal to a height of 90 feet and distribute it for irrigation of 25,000 acres of new land, nine miles southwest of Emmett, Idaho, on the Boise Reclamation project, have been awarded, Secretary of the Interior J. A. Krug announced.

The contract for the "C" Line Canal pumping plant and the pump discharge pipes to supply water to the "C" Line Canals on the Payette Division of the Boise project was placed with the Vernon Brothers Company, Boise, Idaho, on its low bid of $200,369. The contract for a 21-mile section of the "C" Line Canal East and all of the 24-mile "C" Line Canal West went to Marshall and Haas, San Mateo, California, on a low bid of $621,656. Marshall and Haas is a joint venture, composed of S. A. Marshall and the E. T. Haas Company.

Principal items of the work to be performed include nearly 2,500,000 cu. yds. of excavation, placing of 72,600 cu. yds. of backfill and 6,690 cu. yds. of reinforced concrete, placement of 495 tons of reinforcing steel and installing about 200 tons of miscellaneous machinery, cranes, pumps, pipe, and other metal work. The contracts must be completed within 400 days after the contractors receive notices to proceed with the work.

Award Contract on Road Relocation in Pennsylvania

Sponsored jointly by the Federal Government and Pennsylvania, State Highway Route 150, about a mile southwest of Bristol, Pa., is to be moved to a point near Tullytown—a $1,017,000 low

bid project which has been awarded to F. A. Canuso and Sons, Philadelphia.

The new road will be a four-lane highway of reinforced concrete, 4.6 miles long, and will hook up with a piece less than three-quarters of a mile in length. Plans and specifications prepared by the engineers call for construction of three bridges, including one over Otter Creek; one boxed-in culvert; and the filling in of one corner of a lake, approximately 500 by 1500 feet, and a small section of the Delaware canal over which the new road will cross.

Bristol, although 20 miles from the heart of Philadelphia, is only six miles from the northeastern city limits. With the construction of the Lincoln highway a number of years ago, through traffic from Philadelphia to Trenton and New York by-passed Bristol and relieved Routh 150 of much of its former traffic. War plants, however, have greatly increased its use.

Aggregates for Columbia to Be Processed Under Contract

Concrete aggregates from the Odair deposit, between Coulee City and Odair, Washington, for use in construction work on the Bureau of Reclamation's Columbia Basin project in that state, will be processed under a contract, amounting to $172,600.

The contract went to J. G. Shotwell, Albuquerque, New Mexico, the low bidder. Work on the contract involves 42,000 cu. yds. of excavation and stripping in the deposit, preparation of 40,000 cu. yds. of sand, and 70,000 cu. yds. of coarse aggregate separated into three sizes. The material must be washed and screened, and the oversize material crushed to the desired sizes to obtain the greatest possible yield of suitable material.

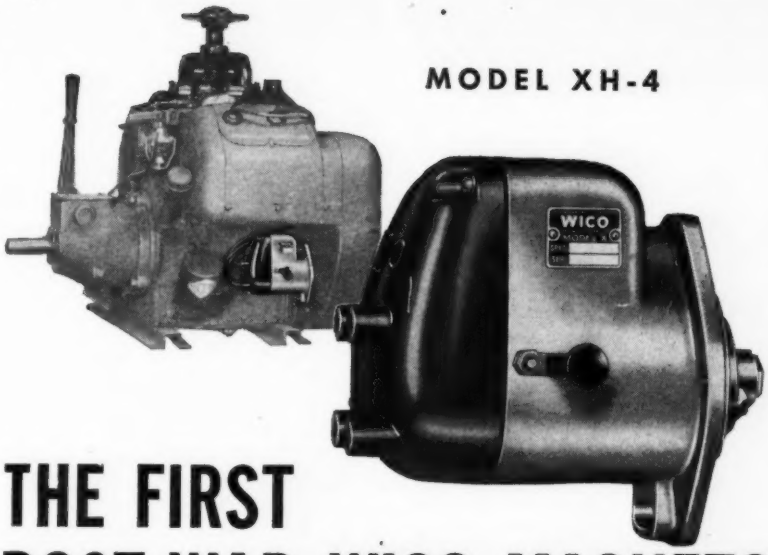
Airports Increase Tenfold But Need Still Great

Twenty years ago there were about 400 airfields in the United States listed at "reliable despite rotation of crops." Only about three of these had paved runways, and none exceeded about 3,000 feet in length.

Today there are more than 4,000 airfields—a high percentage with paved runways, lighting equipment for night operations, and control towers to direct traffic.

Yet today's airfields are as inadequate in numbers as those of 1926. Aviation has taken such giant strides in the interval that today's crying need, like that of 20 years ago, is more airport facilities in convenient locations.

Throughout its history, the CAA and its predecessor organizations have had two principal aims as to airports. First, the design and construction of airports adequate in size and facilities for safe operation which was the responsibility of the airport division. Although the law gave the federal men no positive power with which to enforce their



THE FIRST POST-WAR WICO MAGNETO

[FEWER PARTS - MORE COMPACT]

More compact and incorporating fewer parts, the Model XH-4 replaces the type J WICO Magneto which has been popular for so many years. It is an SAE, flange mounted unit generating four powerful sparks with each revolution of the magneto rotor shaft. Outstanding new features which assure longer service are:

BEARINGS—Shielded sealed ball bearing in the drive end of the magneto and a large pre-lubricated porous bronze bearing in the distributor end.

MAGNETIC ROTOR AND CAM—Large, ring-shaped magnet of Alnico steel to which the laminated pole shoes are assembled and die-cast in aluminum to the rotor shaft. Cam is an integral part of the shaft, hardened and highly polished. This design provides a one-piece sturdy magnetic rotor unit.

COIL—Heavy duty type, surge wound with larger diameter wire and heavier insulation used in outside secondary layers where the greatest electrical strain exists.

DISTRIBUTOR—Jump spark type of plastic of high electrical strength. Distributor arm mounted directly on the magnetic rotor shaft and incorporating the distributor carbon. Extra large leakage distance in the distributor reduces possibility of spark jump-over.

Originally designed for Wisconsin Motor Corporation "V" series engines, they serve as original or replacement equipment wherever the Model J WICO is used. Ask your nearby WICO distributor for a completely descriptive Bulletin. Wico Electric Company, West Springfield, Massachusetts.

WICO

THE HEART OF YOUR ENGINE

Whatever the type of jack, a Simplex is safer and easier to operate.

SIMPLEX
WORLD'S MOST COMPLETE LINE OF
JACKS
LEVER
SCREW
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Ask for Catalog 45
Templeton, Kenly & Co., Chicago 44, Ill.

• Russians use Bucyrus-Erie 2½-cu. yd. shovel to load coal to railroad cars in the greatly developed Karaganda coal fields. The large coal deposits lie only about ten feet below the surface.

standards, they were able through close cooperation with municipalities and with airport engineers to avoid the building of unsafe airports. The second aim was to see that every airport contributed directly to a national airport system. The growth of the airlines, and the construction of new airways were guiding factors in this aim.

Between 1925 and 1930 the enthusiasm of the promoters of aviation resulted in several spurts in airport building. The Ford Reliability tours, starting from Detroit and making large swings about the country, dramatically called attention to the possibilities of the airplane for personal and freight transportation, and resulted in many a city bond issue for airport construction.

The flights of Lindbergh and others about the world, and their subsequent tours throughout this country also focussed attention on the need for landing facilities.

The work relief programs of the depression times proved a boon to airport construction. Through the WPA, the ERA and the FERA, many a city and town obtained an airport. Like any other public utility, the airport is a good item in a public works program.

The greatest spurt in airport construction came, however, in World War II, when the military had to consider the need for airports for possible defense of the country against aerial attack, and the facilities for training quickly the largest air force in the world. Several agencies built airports. The CAA built 525, at a cost of $400,000,000. There was an important feature in this program, however, in that the CAA attempted to locate these airports so they would be valuable for civilian use after the war. Thus, the CAA was able to build war facilities for future peacetime use, and the cities which cooperated agreed to operate these fields for the benefit of all the people.

As a result, we now have an excellent start in providing the large airports we need. The CAA's National Airport Plan proposes 3,000 new airports of which 2,900 will be small ones for the use of private fliers.

In some respects, however, the terminal airport problem today is more acute than ever. The growth of airline schedules now brings up the question of multiple airports at certain cities, or the construction of an entirely new and larger commercial airport.

Air traffic congestion in the New York City area, particularly in bad weather, sometimes grounds commercial flights as far away as Richmond and Cleveland. This is a foretaste of what we can expect in busy areas throughout the nation as passenger and

EXPERIENCE builds 'em
When the "GOING IS TOUGH" and the "LOAD IS HEAVY"

PERFORMANCE Sells 'em
movers of heavy equipment Rely Upon
ROGERS
HEAVY DUTY
Gooseneck Trailers

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1360 ORCHARD ST. • ALBION, PA.

BOSS of the BULLDOZERS

THERE'S a new champion among bulldozers. Designed, built and put through the stiffest of job-tests by Caterpillar Tractor Co., the new "Caterpillar" Bulldozer entered the earthmoving field a year ago. Its success has been immediate and unqualified. Old hands in the business who have used them all say without hesitation it's writing new history in fast, economical earthmoving.

Among the outstanding advantages of the "Caterpillar" Bulldozer are these:

1. The scientific curve of the blade rolls the earth ahead instead of shoving it—producing greater capacity and lower yardage costs.

2. With the famous "Caterpillar" Diesel Tractor, this 'dozer is a matched, perfectly balanced work unit. Tractor and 'dozer are both built by the same experienced manufacturer—both sold and serviced by the same well-equipped dealer.

3. It can be mounted and demounted quickly, with none of the inconvenience of an overhead frame.

4. Extra-hard steel gives the blade edge long, durable life.

5. Cable controls are fast, sure-acting, easy to operate, and cables and sheaves are protected from dirt-clogging.

"Caterpillar" Bulldozers with straight or angling blade are available for the three larger sizes of "Caterpillar" Diesel Tractors and they'll make a lot of dirt fly in the great earthmoving days that are ahead.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

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REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

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HAYWARD BUCKETS

WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD CO.
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cargo operations expand—unless airport expansion is rapid.

Private flying is being severly handicapped by lack of landing facilities within the limits of big cities. Suppose a man with a private plane wants to visit a city 100 miles away. It may take him an hour to get to his airplane, hangared at a field far from his home. The flight itself might take an hour. When he reaches his destination, it may take him another hour to get into the business section of the town he is visiting. For practical purposes, this man's trip was made at an average of only about 33 miles an hour, instead of the 100-mile-an-hour speed of his airplane. In addition, he has suffered inconvenience at both ends of the journey. The solution is obvious—more and more conveniently located airports.

In most respects, the airplane has been greatly improved since 1926. But planes of 20 years ago, with their low wing loading and large wheels, could take off readily from small, rough fields with runways of 2,000 feet. Today's large transport planes require runways of approximately 5,000 feet in length, expensively constructed to withstand the impact of 50-ton loads.

The Office of Airports of the CAA stands today on the verge of one of the largest airport building programs in history, even including the wartime program. Even before Congress had decided on the principle of 50-50 matching of federal funds by cities and states, hundreds of new fields were being planned and constructed by returning service men establishing small businesses, and other hundreds of fields closed by the war were being re-opened. This privately-financed activity is expected to continue, and even to be increased by the government program.

• Aligning eight-inch cast iron water pipe at West Point Military Academy, N. Y. Because of the nearness to a hospital area great care had to be exercised in blasting the rock which was then removed by a Koehring 251 clamshell. One hole was drilled and blasted at a time. Kuscher Bros., Montvale, N. J., were contractors.

Place 360,000 Yds. in Month At Anderson Ranch

Approximately 360,000 cu. yds. of earth and rock were placed in the embankment of Anderson Ranch Dam, near Mountain Home, Idaho, from June 26 to July 26, a record month second this year only to June, Don S. Walter, newly-appointed Construction Engineer, reported to the Northwest Office of the Bureau of Reclamation.

Walter, who was recently appointed to supervise construction of the world's highest earth-fill dam, said that 316,500 cu. yds. of earth was included in the total. All of this was moved from a borrow pit nearly two miles away to the dam site by a unique conveyor belt system.

Kentucky County Road Program is Started

Contracts have been completed between the Kentucky Department of Highways and all of the 120 Kentucky counties relating to State aid on county roads, J. Stephen Watkins, Commissioner, announced following receipt of the report of George H. Hailey, Director of the Department's Division of Rural Highways. Contracts have already been let in 25 counties for a total of 380 miles of resurfacing and new roads under the $5,000,000 State aid program.

"We are obligated to aid in the maintenance of 10,232 miles of county roads," Hailey's report stated. "In addition to this, we have agreed to assist in the construction of 1,092 miles of new all-weather routes. Our total contracted State aid is 11,324 miles, of which we have let to contract 380 miles. In counties having registered engineers, we are supplying material with the county handling the work. This totals 862 miles."

"In our new and enlarged program

"Harcote 20" Rockwell C Hardness 15-25
"Harcote 35" Rockwell C Hardness 30-40
"Harcote 45" Rockwell C Hardness 40-50
"Harcote 55" Rockwell C Hardness 50-60

NOW! P&H Hard-Facing Electrodes To Match Desired Rockwell "C" Hardness

P&H now makes hard surfacing a simpler, easier job — easier in the selection of the correct electrode . . . easier to get the desired as-welded hardness.

These four new P&H "Harcote" Electrodes do it! For now Harcote is available in a type having the exact degree of Rockwell C hardness for the job. If the job calls for a Rockwell C hardness of 55 — just order and use Harcote "55". That's all there is to it! No guesswork — no confusion. Simply specify "Harcote" according to the corresponding number of Rockwell "C" hardness desired.

SAVE TIME — SAVE EQUIPMENT — USE P&H HARCOTE

Call Your P&H Representative or write for complete information on Harcote. A complete line of other P&H electrodes is also available.

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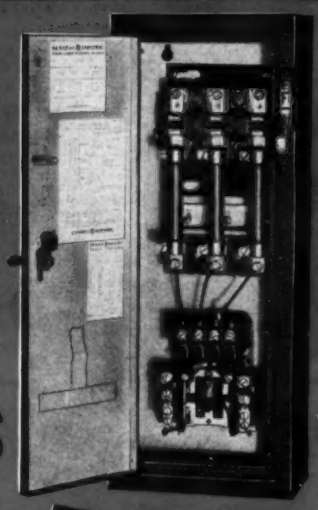
Sacking the seeds, one of the many processes controlled by G-E combination starters at the Rohnert plant



59 G-E COMBINATION STARTERS Control the Processing of 1/4 of the World's Vegetable Seeds

COMBINATION STARTERS SAVE TIME, SPACE, AND MONEY

Every process from eliminating dirt and debris to sorting the seed to size is controlled by G-E combination starters at the Waldo Rohnert Co., world's largest producers of garden vegetable seed.

In their four-story plant, completed in 1944, and said to be the most modern of its kind in the country, ¼ of the world's garden vegetable seed is processed—that's far more than a million pounds of clean seed a year. All electrical, it boasts 59 General Electric CR7008 combination starters and supplementary control which regulate the five separate seed mills of their complicated seed mill system.

According to Fred Rohnert, son of the founder, *"Our G-E controls and equipment have proved extremely satisfactory. They've given us no trouble since their installation."*

And here's why these starters have proved so satisfactory—

COMBINATION STARTERS SAVE TIME—

In addition to the time saved in ordering, outstanding savings in installation time are made with these starters. Users report a 50 per-cent reduction in mounting time, a 40 per-cent reduction in wiring time, as compared with the installation of two separate devices. You connect to only 9 terminals instead of 15.

SPACE—

Valuable wall space is saved because combination starters can be installed in small, unused places either near to or remote from the operator.

AND MONEY—

While the list price is slightly higher than for two separate devices, the difference is more than made up by savings in wire, fittings, and time.

WHAT IS YOUR APPLICATION?

Combination starters come in a variety of enclosures to meet any operating condition in your plant. If you'd like more information, ask our nearest office for Bulletin GEA-2715A. And remember, our engineers will be glad to help you with your application. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

• Philip Breedlove, Los Angeles, uses his TD-9 Dozer-Shovel to excavate hard soapstone material for new home.

the State has had excellent cooperation from the county fiscal courts," Watkins said. "We were unable to frame any contracts until after the Legislature had given us the appropriation and our new fiscal year had started, but our program for 1946 is well underway. The next two months should show some excellent progress.

"Approximately one-tenth of all the contracted mileage will be in new roads. This represents about one-fourth of the funds available. The State must protect its investment in the roads already built but must also exert every effort to open up new roads for all-weather travel."

Utah Construction to Start On Angostura Dam

Work will begin soon on the Angostura Dam (South Dakota), the second Bureau of Reclamation unit to be constructed in the vast Missouri River Basin development. A contract for the construction of the Angostura Dam has been awarded by Secretary of the Interior J. A. Krug, to the Utah Construction Company, Ogden, Utah, on its low bid of $4,237,476.

The Angostura Dam will be built on the Cheyenne River, nine miles south of Hot Springs, S. D., in the southwestern part of the State.

The Angostura Dam will be a concrete gravity type dam extending from the left abutment across the river channel and an earth embankment at the right abutment. The dam will be 1,900 feet long at the top and 150 feet high. Its reservoir will have a water storage capacity of 220,000 acre-feet, including 60,000 acre-feet of super storage for flood control. Future contracts on the Angostura unit will provide for construction of the main canal, which will be more than 30 miles long, and additional structures including four siphons and 17 bridges. The principal siphon will cross the Cheyenne River and will be 9,635 feet long and 54 inches in diameter. Ultimately a power plant will be constructed to furnish power for downstream pumping units to irrigate the additional acreage. However, present construction plans do not include the power plant or the pumping units.

The Missouri River plan, prepared jointly by the Bureau of Reclamation and the U. S. Army Corps of Engineers, calls for a basin-wide development of natural resources, flood control and improvement in navigation. The Angostura Dam is a key feature of one unit under this plan which includes more than 200 units involving 10 states.

The Missouri River plan calls for the construction of more than 100 dams and 150 irrigation projects that will contain thousands of miles of canals and other facilities. Hundreds of miles of flood control dikes and levees will be built and 760 miles of uniform river

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ONAN ELECTRIC GENERATING PLANTS supply reliable, economical electric service for excavating and contracting uses as well as for scores of other general applications.

Driven by Onan 4-cycle gasoline engine, these power units are of a single-unit, compact design and sturdy construction. Suitable for mobile, stationary or emergency service.

CAPACITY RANGE: 350 to 35,000 Watts.
ALTERNATING CURRENT: 115 and 230 Volts, 50 and 60-Cycle, single phase for all capacities. Three-phase for models 3 KW or larger. Other voltages and frequencies available.
DIRECT CURRENT: 115 and 230 Volts, 600 to 10,000 Watts. 6, 12 and 32-Volt Battery Charging types to 3500 Watts.
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channels for the promotion of low-cost navigation. At least 19 communities will be provided with safe water supplies. Twenty power plants will be built to supply power for irrigation pumping and for agricultural and industrial uses.

It is estimated that the new land and the consequent industrial exansion will support a population of more than 600,000 persons in the basin states, and provide new markets for manufacturers, distributors, and labor throughout the country.

State Road Awards Are $241,000,000 in Six Months

During the first six months of the year, state highway departments awarded 1,574 contracts for Federal-aid highway projects having a total construction cost of $241,034,333, according to reports received by the Public Roads Administration.

Contract awards in June for Federal-aid projects amounted to 344, at a cost of $55,132,392, as compared with a total of 425 contract awards in May for highway construction costing $58,166,360. At the end of June, 244 contract offers for work to cost $22,085,759 were still under consideration.

State highway departments during June rejected bids for 64 Federal-aid projects involving $12,823,371 worth of construction, making a total of 393 bids rejected by the states since January 1, without action by the Public Roads Administration. In each instance the low bid was far in excess of the engineers' estimate of construction costs. Only two bids were rejected during June because of the Public Roads Administration's refusal to concur in the award of contracts. Refusal of concurrence was prompted by high bidding.

Contract awards in June for all types of road work, including Federal-aid projects, National Park and National Forest Roads, and state-supervised road work financed entirely by state and local government agencies, totaled 1,180, at a total construction cost of $83,055,612, bringing the number of road contracts let since January 1 to 4,672, at a cost of $344,044,710. These contracts called for improvements on 22,308 miles of roadway.

Interstate Route Accepted By 39 States to Date

Thirty-nine states and the District of Columbia have accepted without reservation the integration by the Public Roads Administration of routes proposed by the states to form the national interstate highway system, Commissioner Thomas H. MacDonald announced.

Of the nine remaining states, four desire alteration of the integrated system proposed. Two of these states accepted a portion of the routes included in the tentative integration but rejected certain sections without alternative proposal. Another state followed the same course except that additional mileage was proposed. One state accepted the proposed system in entirety but requested inclusion of additional routes.

Five states have not as yet responded to Public Roads' recommendations, but the prospect of early agreement with most of the nine states "is not discouraging," Commissioner MacDonald said.

Development of a 40,000-mile interstate highway system was authorized by the Federal-Aid Highway Act of 1944, and the states were asked last year to recommend routes for inclusion in the system. The total length of routes selected by state highway departments was 45,074 miles, which included some duplicate mileage and more than 2,000 miles of circumferential and distributing routes in urban areas.

After reviewing the initial route selections recommended by the states, which in some instances involved disagreement between adjoining states concerning connections at state boundaries or the proposal of alternate routes within a state, Public Roads offered a tentative integration of the system.

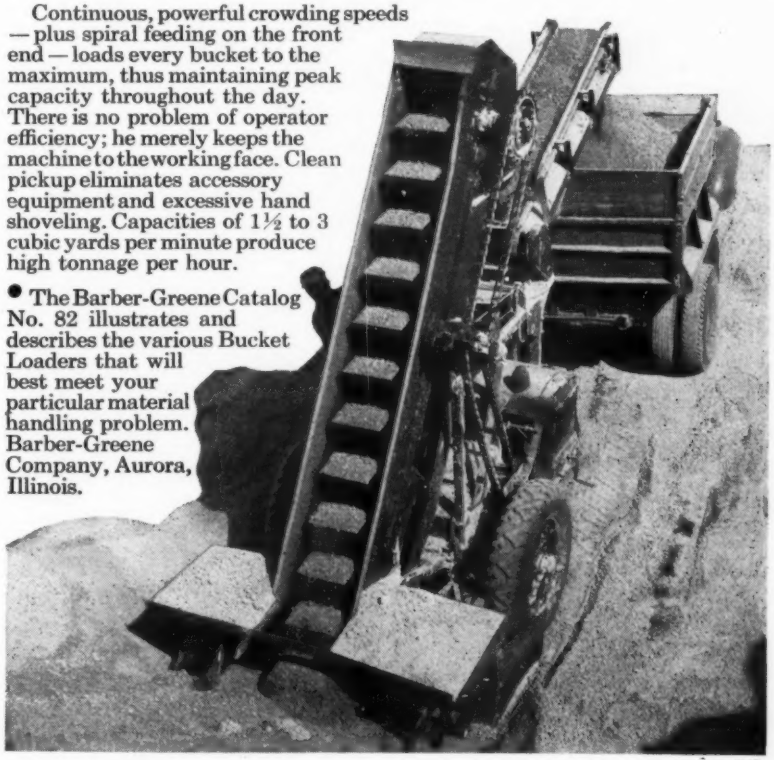
All circumferential and distributing routes in urban areas were omitted from the tentative integration presented for state consideration. The main routes between and across cities which are included in the interstate system as recommended by Public Roads include

Why a BG Bucket Loader Loads faster from Stock Piles

• Barber-Greene Bucket Loaders are designed specifically for picking up material from stock piles and loading to trucks or processing equipment faster and cheaper than any other method.

Continuous, powerful crowding speeds — plus spiral feeding on the front end — loads every bucket to the maximum, thus maintaining peak capacity throughout the day. There is no problem of operator efficiency; he merely keeps the machine to the working face. Clean pickup eliminates accessory equipment and excessive hand shoveling. Capacities of 1½ to 3 cubic yards per minute produce high tonnage per hour.

• The Barber-Greene Catalog No. 82 illustrates and describes the various Bucket Loaders that will best meet your particular material handling problem. Barber-Greene Company, Aurora, Illinois.



BG Barber-Greene CONSTANT FLOW EQUIPMENT

• Logs vitally needed to alleviate the housing shortage are skidded to a landing in Oregon by an Allis-Chalmers HD-14 tractor.

37,170 miles. This leaves a balance of 2,830 miles within the 40,000-mile statutory limitation, which is considered a sufficient reserve for the later selection of circumferential and distribution routes, Commissioner MacDonald said.

The Federal-Aid Highway Act of 1944 did not authorize a specific appropriation for the development of an interstate highway system, but provided for an annual appropriation of $225,000,000 in each of three fiscal years for improvements on the Federal-aid system and $125,000,000 for highway projects on the system in urban areas. Since the interstate system will automatically become a part of the Federal-aid system these funds will be available for expenditure on the system.

Development of the system eventually will provide two-lane, four-lane, and in some instances six-lane highways for fast-moving traffic between all cities having a population of 100,000 or more and a majority of the cities of 10,000 to 100,000 population.

Engineers Let Contracts for More Than $91,000,000

Army Engineers have let civil works contracts for more than $91,000,000 from V-J Day to June 1, 1946, the War Department announced. The statement was based on figures released by Lieutenant General Raymond A. Wheeler, Chief of Engineers, and involved 334 contracts for Rivers and Harbors and Flood Control projects. In addition to contracts let, the Army Engineers, it was stated, have out invitations for bids on a number of additional projects.

The projects are scattered through 39 states, the number ranging from a solitary contract in some states up to 74 contracts in Louisiana, the largest number let in that period in any one state. They range in monetary value from about $10,000 in some states to more than $21,000,000 in Oklahoma, which leads at the present time in monetary value of the contracts let by the Army Engineers in this period.

Largest individual contract let during the period is for the initiation of construction of a dam, powerhouse and appurtenant works at the Allatoona Dam and Power Project on the Etowah River in Georgia. The estimated cost is $13,281,888. This is the project on which Lieutenant General Wheeler broke ground on June 14, with Governor Arnall and other Georgia dignatarties in attendance. National Constructors, Incorporated of Columbus, Georgia, have been awarded the contract. The firm is composed of the Hardaway Contracting Company of Columbus, Georgia, the L. E. Dixon Company, of Los Angeles, California, and the Arundel Corporation of Baltimore, Maryland.

Peacetime program of the Corps of Engineers was greatly enlarged on July 1, when the $308,845,250 appropriated by the Congress for the Rivers and Harbors and Flood Control work for the fiscal year of 1947 became available. Contracts for new work will be let and construction on some of the larger projects increased.

Begin Work on Hungry Horse Dam in Montana

Preparatory work for the construction of Hungry Horse Dam in Montana was set in motion today with the award of two contracts, amounting to $570,782, for building an access road to the dam site, and a warehouse at the Hungry Horse Government Camp, Commissioner Michael W. Straus announced.

The contract for the road went to S. Birch and Sons Company, McLaughlin Inc., and the C. and F. Trucking Company of Great Falls and Butte, Montana, as joint venturers, on their low bid of $479,494. The warehouse contract went to the Dudley Construction Company, Great Falls, Montana, on its low bid of $91,288.

The Hungry Horse project of the Bureau of Reclamation is located 25 miles from Kalispell, Montana, on the South Fork of the Flathead River. The access road to the project will be 3.9 miles long, and will be situated about 20 miles northeast of Kalispell. The roadway will be 26 feet wide, and the principal items of work on it will include more than 376,000 cu. yds. of common and rock excavation, pouring of 340 cu. yds. of concrete, and placing of 17 tons of reinforcement bars. The road will have an asphalt surface.

The warehouse will be located about eight miles east of Columbia Falls, Montana, in the immediate vicinity of the dam site.

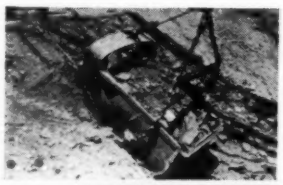
Studies and surveys indicate that the dam will be a straight gravity type

(Continued on page 522)

"Red Arch" Features Add up to EXTRA OUTPUT

Digging is Fast and Easy

with a Red Arch bucket because the teeth and sharp cutting edge are set at just the right angle . . . and the high arch permits heaping loads to flow easily into the bucket



Carrying is Smooth,

thanks to careful design and perfect balance. Even with a heaped load and fast swing there's but little spillage with a Red Arch bucket . . . . . .

Dumping is Quick and Clean

because the high arch lets the load pass freely, while the rounded lines and smooth inside of the Red Arch eliminate jamming of dirt in corners . . . . . .

. . . All add up to . . . EXTRA OUTPUT

Let Red Arch buckets add up extra output for you. Write for full information on the three types for light, medium and heavy digging . . . in sizes from ⅜ yard up. SR46C

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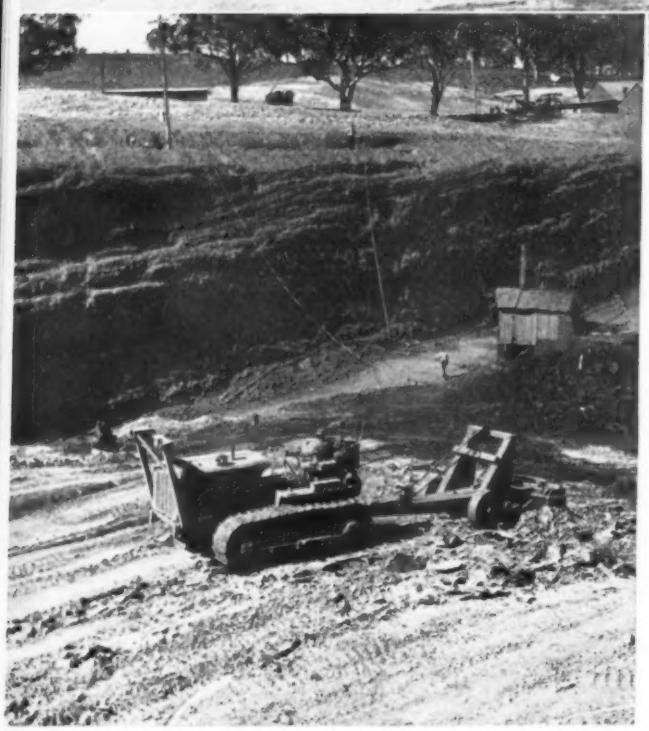
Quick getaway and high-speed haul meant more yards per hour on ½ to 1 mile cycles.



LeTourneau Rooter breaks up shale and slate. Tournapulls load, haul and spread any material a Rooter can dig loose.

Theiss Brothers use Tournapulls' high-speed haul, big load capacity, to break Allied coal bottleneck.

PROBLEM — In 1944, coal situation for Allied use in Australia was desperate. New sources of supply had to be developed quickly. Commonwealth Coal Commission decided to establish new open-pit mines to increase local production, let contract for stripping operations at Mussellbrook, near Newcastle, N.S.W. to Theiss Brothers, Brisbane. Overburden ran from 15 to 25' deep . . . varied from earth and clay to shale and slate.

SOLUTION — Theiss moved 4 Tournapulls onto job, quickly stripped off earth and clay, wasted it at distances varying from ¼ to ½ mile, eliminating problem of re-handling. The rigs' 15-heaped-yard capacity, high-speed haul and big rubber-tired traction kept production high despite unfavorable haul grades.

Tournapulls' fast, accurate spread leaves level dump . . . No additional spreading equipment is needed.

TOUGH 25′ OVERBURDEN coal moving in 3 weeks

Pit open, coal coming out. Tournapulls keep on stripping to open up additional coal.

Shale and then slate were broken up by LeTourneau Rooter. In this difficult material, Tournapulls got heaped loads, kept up their highball schedule.

RESULTS: — 3 weeks after start of job, coal was loading into railway cars. Initial quota of 10,000 tons of coal a day was quickly bettered. Production soon reached maximum railway capacity as Tournapulls opened more pit area. So fast, convenient and economical was Tournapull stripping that further Australian open-cut projects by similar method are being planned.

In any type of mining where haul or rehandling is involved, Tournapulls are the lowest-net-cost-per-yard answer to your problem of overburden removal. Your nearest LeTourneau Distributor can give you proof of low-cost, big-yardage Tournapull performance on both long and short hauls . . . in all types of materials . . . under tough pit conditions. Ask him for facts and figures today!

Tournapulls' big, low-pressure tires are easy on haul roads. Rigs can build, surface and maintain their own roads.

Start of stripping operations. 3 weeks later, coal was being loaded into railroad cars.

E TOURNEAU PEORIA, ILLINOIS · STOCKTON, CALIFORNIA

JOB-PROVED Over 4500 Built and Shipped

TOURNAPULLS

• Rear-mounted winch and boom on Caterpillar D8 tractor working on river channel clearance project below Boulder Dam. The Guy F. Atkinson Co. was awarded the contract for this $2,500,000 job. The work involves excavation of 550,000 cu. yds. of loose fill on the river banks; the removal of 275,000 cu. yds. of material from the river channel; the excavation of 2,600 cu. yds. of concrete in existing tunnels; the placing of 43,200 cu. yds. of reinforced concrete and the location of one-half mile of highway.

Shots from the Firing Line

(Continued from page 518)

concrete structure, containing between two and three million cu. yds. of concrete, with a height above the stream bed of about 450 feet. A power plant of 142,000 kilowatt capacity is included in the plans.

The access highway now under contract will carry the heavy traffic during the preconstruction and construction stages of the project, and will be needed after the project is completed for the operation and maintenance of the dam, as well as by Forest Service personnel and vacationists.

The contract requires that the road be completed within 360 days after the contractors receive notice to proceed. The warehouse must be completed in 150 days.

Contract Granted for Preparing Concrete Aggregates

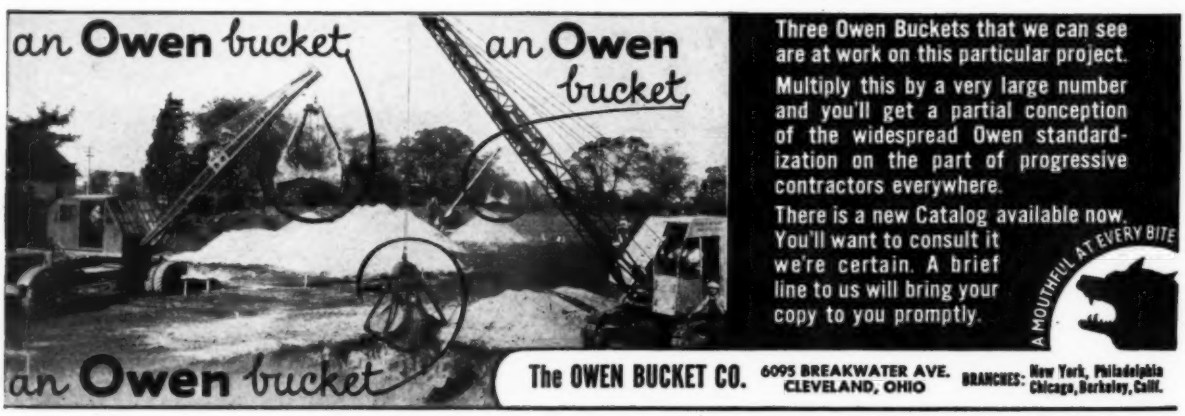
J. G. Shotwell, Albuquerque, N. M., has been granted a $172,600 contract for preparing concrete aggregates for the Columbia Basin Project construction program in the vicinity of Coulee City, Grant County, Washington, the Bureau of Reclamation announced.

Shotwell's contract calls for 42,000 cu. yds. of stripping, and the preparation of 40,000 cu. yds. of sand and 70,000 cu. yds. of coarse aggregates from the Bureau-owned deposit northeast of Coulee City. Materials will be used in the 10,000-foot South Dam in the Grand Coulee, the Main Canal, and the Bacon siphon and tunnel. The South Dam, an earth-and-rock structure, will require concrete in a cut-off wall at its base, for a parapet wall, and for headworks, said Resident Engineer H. P. O'Donnell.

Urge States Keep Federal Aid Spending Down

Thomas H. MacDonald, Commissioner of Public Roads Administration of the Federal Works Agency, has urged the state highway departments to keep Federal-aid highway expenditures at a minimum, consistent with the policy of the President in curtailing activities of other Federal works in the fiscal year 1947. Since the highway departments have consistently followed the policy of rejecting bids where prices were held to be too high the current program is far below what would be normal under different circumstances. Continuation of this policy and even more rigid application was requested.

Projects requiring structural steel should be wholly eliminated until conditions change radically, so that fabricators will be able to obtain definite commitments as to delivery and firm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Three Owen Buckets that we can see are at work on this particular project.
Multiply this by a very large number and you'll get a partial conception of the widespread Owen standardization on the part of progressive contractors everywhere.
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prices from the steel mills, the Commissioner said.

The restrictions of the directive issued by the Office of War Mobilization and Reconversion on August 6 relative to new commitments for construction by the Federal Government do not apply to the provision of Federal aid for highways where the Federal Government has already made commitments to the states for the provision of aid through the approval of programs by the Public Roads Administration. Commissioner MacDonald has advised the state highway departments to this effect after discussion with the Office of War Mobilization and Reconversion.

Twenty-Sixth Annual Meeting

The twenty-sixth annual meeting of the Highway Research Board will be held this year December 5-8 at the National Academy of Sciences and the National Research Council building, Washington, D. C.

OBITUARIES

JOSEPH H. JACKSON

Joseph H. Jackson, 52, vice-president of Carbon Limestone Company and of the Carbon Concrete Brick Company, died of a heart attack at Youngstown, Ohio, on May 26. He had been affiliated with the Carbon Limestone Company since 1918.

CHARLES SCOTT LANDERS

Charles Scott Landers, 66, consultant engineer who specialized in foundation work for the Woolworth Building and other nationally-known structures, died July 27 at his home in New York City.

Buildings in New York on which he had been in charge of foundation work included the Municipal Building, the Singer Building, the Trinity Building, American Telephone and Telegraph Building and the building of the Bankers Trust Co. At the time of his passing he was working on three foundation projects: Stuyvesant Town, a Harlam housing project and a projected truck terminal for the lower West Side in Manhattan.

Mr. Landers was graduated from the Hotchkiss School, Lakeville, Conn., in 1896. Four years later he was graduated from the Scheffield Scientific School, Yale University, returning there in 1902 to teach mathematics. He subsequently began his career as a civil engineer. He not only published one of the first maps of greater New York City sub-strata, but liked to accept challenges to visit a specified point and specify the approximate sub-strata conditions.

Included in his early engineering experience was work in Ecuador; tunnel work for the Pennsylvania Railroad under the Hudson River; and many large projects for the Foundation Co. Later, as an independent consultant he handled the foundations for the Woolworth Building and many other prominent structures. He also supervised the foundations for the Gulf Oil Building in Pittsburgh, Pa. An enthusiastic tennis player, he was especially proud of his design of the West Side Tennis Club at Forrest Hill, Long Island. He formerly headed this club.

Mr. Landers was a member of the American Society of Civil Engineers and the Mole and Yale clubs. Surviving are his wife, the former Josephine Schramm of New York, and a son, Charles Scott Jr.

• Two Ruston-Bucyrus shovels cutting down hill in pre-war scene of construction of new highway at Kaiwaka, New Zealand.

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Landing the "big fellows" is not a matter of chance or "tackle". To be successful, one must acquire the knack and "know-how".

And so it is with making Wire Rope.

Machinery and equipment alone will not necessarily produce a rope qualified to meet every contingency . . it's knowing how to make it that really counts, and "HERCULES" (Red Strand) Wire Rope is the result of over sixty-eight years of manufacturing experience, *plus* continued research and determination to produce the best.

So, by adopting the (Red Strand) as your Wire Rope guide, you gain the advantage of getting the right construction to fit your particular job, as well as dependable and economical results . . . *consistently.*

Your inquires are welcome . . . and we invited them.

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NOT in the *Contract*

Patient: "Why stick me in the room with that crazy guy?"

Doctor: "The hospital is crowded. Is he troublesome?"

Patient: "I'll say. Just keeps looking around saying, 'No lions, no tigers, no elephants'—and all the time the room's full of them."

Woman resident in China to her houseboy: "You should knock before bringing my linen into the bedroom."

Houseboy: "That's all right, missy. Every time come, lookee through keyhole. Nothing on, no come in."

Her hat was askew, her clothes rumpled and one shoe missing.

"Knocked down by a motorist?" she was asked.

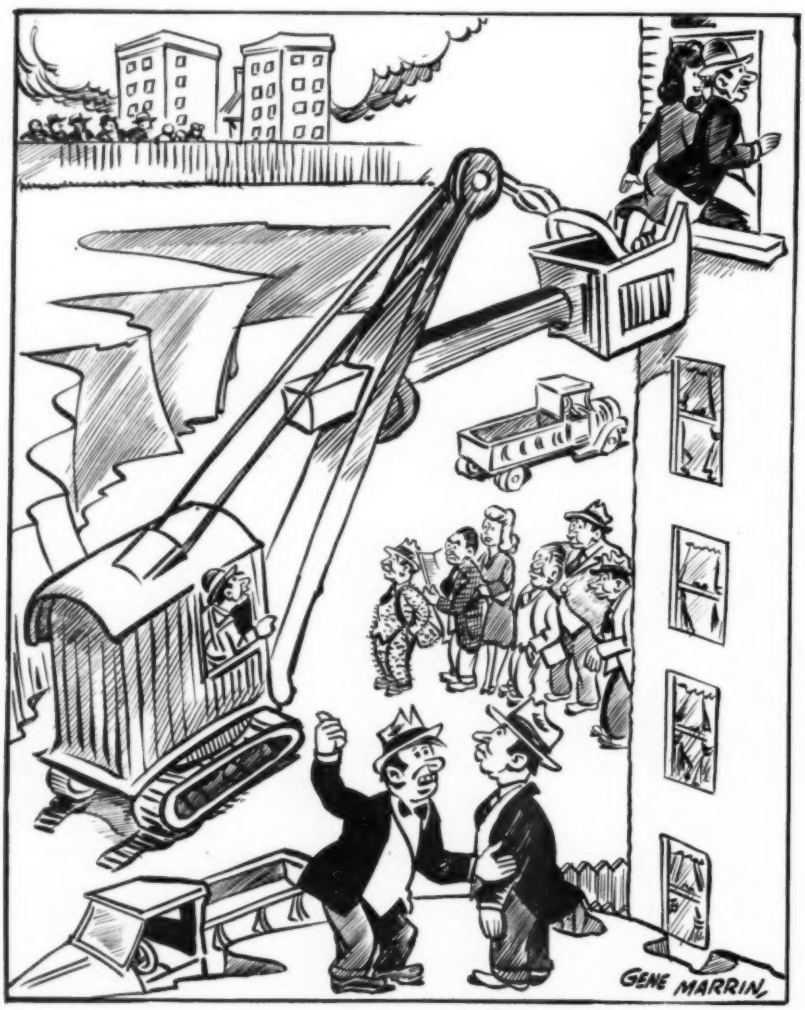
"Nope. Picked up by one!"

Dean of Women: "Why did you come to college?"

Coed: "I came to be went with —but I ain't yet!"

"How did you find the ladies at the dance?"

"Oh, I just opened the door marked 'Ladies' and there they were."



"He's making plenty on the side during the elevator strike"

A prominent contractor had a ticket for a USC-Notre Dame game at the Los Angeles Coliseum. The usher climbed with him to a certain point, but then pulled back, saying, "You'll have to make the rest of the ascent alone. Any higher than this, I get nose bleed." The contractor finally reached his seat. Sometime later he nudged the man next to him. "Great game, isn't it?" he hazarded. "Whaddya mean, game?" was the answer. "I'm flying the mail to San Francisco."

A little fishing worm stuck his head up out of the damp ground and saw another worm close by, sticking up out of the ground.

He said: "My, you're cute. I could go for you."

Replied the other worm: "Don't be silly; I'm the other end of you."

A pedestrian is a man who has two cars, a wife and a son.

Two drunks were whizzing down the road.

"Shay look out there, Joe. You almost ran into that telephone pole."

"Who, me? I thought you were driving!"

They laughed when I sat down at the piano, but when the little blonde soprano gave me the key to A flat . . . boy, how I accompanied her.

"From this examination, I would stake my reputation as a physician that you are suffering from a clergyman's sore throat."

"The hell ya say!"

"But then on the other hand, I could be wrong. I'll look again."

A young chap, whose sweetie had just made him the happiest man alive, went into a jewelry store to buy the engagement ring. He picked up a sparkling diamond and asked its price.

"That one is $300," replied the jeweler gently.

The young man looked startled, then whistled. He pointed to another ring. "And this one?"

"That, sir," said the jeweler, still more gently, "is two whistles."

New trade literature

Title: **Haiss Portable Conveyors**
Subject: A new catalog describing the types and uses of the Haiss line of conveyors. Illustrated with action shots and specification charts, the 24-page folder also presents types of other Haiss equipment.
Where to Get: George Haiss Mfg. Co., Inc., New York 51, N. Y., Catalog 1245 (Free)

Title: **Liftmaster Nu-Hydro Jacks**
Subject: This bulletin, No. 190-J, describes a new line of hydraulic jacks, built of drop forged steel by Joyce. The announcement gives specifications for the various models of the jacks.

Title: **"Welding and Brazing Copper and Copper Alloys"**
Subject: A 32-page handbook of procedures and materials. The book is divided into three sections, the first of which gives important definitions of materials and processes, accompanied by a table of compositions and properties of the most commonly welded and brazed commercial copper alloys.
The second section discusses each of the common copper alloys individually. Information is given as to composition, physical properties, forms usually supplied, suitability for hot and cold working and special welding characteristics. The final section is devoted to welding and brazing materials for copper and copper alloys, and the general plan of treating each material separately is followed.
Where to Get: C. E. Phillips & Co., 2750 Piplar St., Detroit 8, Mich. (Free).

Title: **Circular C 50**
Subject: A new publication concerned with the study of the corrosive action of soils on underground pipe lines. The result of 25 years of investigation, the book deals with the action of the soil on pipes made from various metals and alloys. The results of tests on a number of promising coatings developed in the laboratory are also presented in the publication.
Where to Get: Superintendent of Documents, Government Printing Office, Washington 25, D. C. Circular C 450 $1.25 per copy.

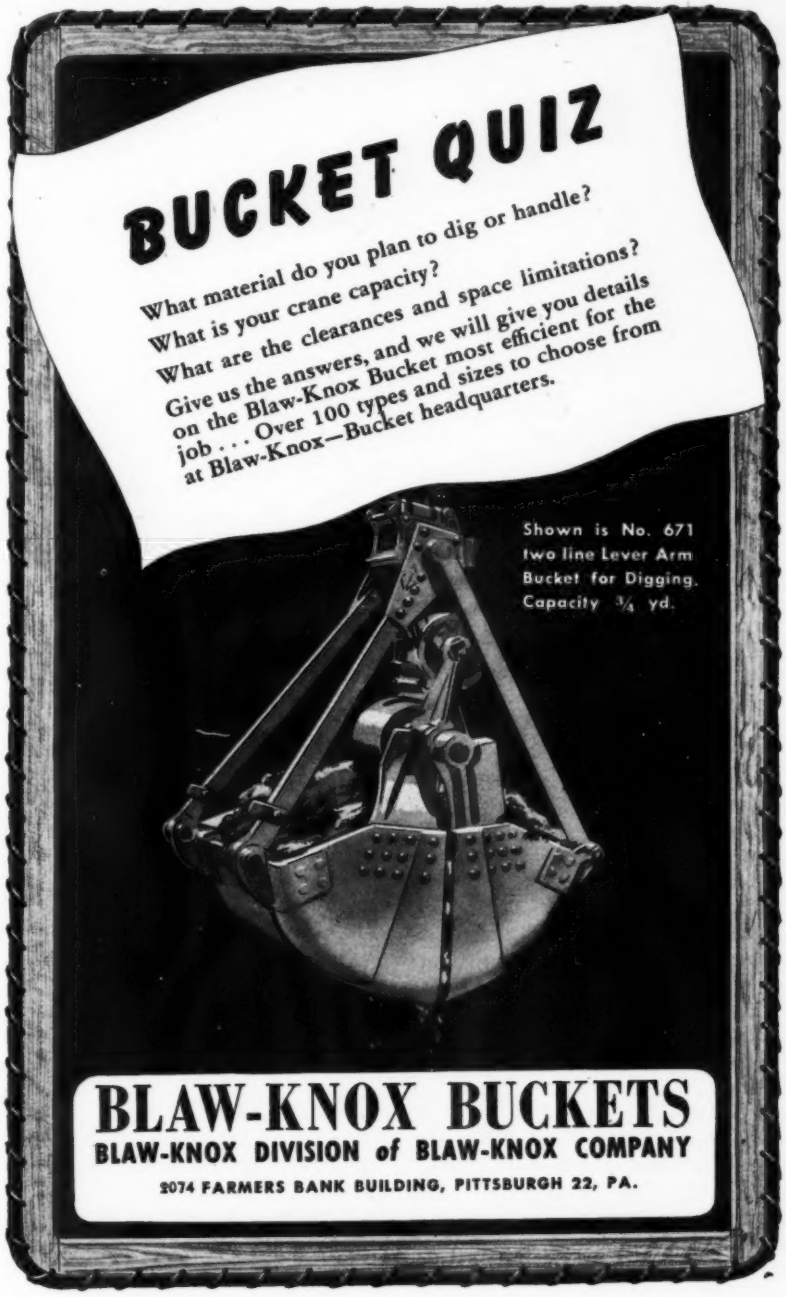
Title: **Homelite Portable Generators**
Subject: Four-page bulletin pictorially describes the standard line of new models of Homelite-developed generators. On-the-job photographs show new designs and wide range of the portable power plants.
Where to Get: Homelite Corporation, Port Chester, N. Y. (Free)

Title: **Caterpillar Bulldozers Nos. 8S and 7S**
Subject: A well-illustrated broadside that describes the two latest straight-type bulldozers—designed and built for expensive use with Caterpillar Diesel D8 and D7 Tractors. The broadside shows the attributes of the equipment and explains the use of the specially designed features.
Where to Get: Caterpillar Tractor Co., Peoria 8, Ill. Form 9198 (Free)

Title: **"Products of Eaton"**
Subject: This booklet illustrates and briefly describes Eaton's principle peacetime products and its new products developed in its research laboratories for industrial markets.
Where to Get: Eaton Mfg. Company, Cleveland 10, Ohio (Free).

Title: **"Belting Catalog"**
Subject: Designed to aid all industrial plants and maintenance men in the selection of the right equipment for the job, a new belting catalog has just been published by Hewitt Rubber Division of Hewitt-Robins Inc. Information in the two-color loose leaf publication includes specifications on the company's wide line of conveyor, transmission and elevator belting sold

(Continued on page 528)


BUCKET QUIZ
What material do you plan to dig or handle?
What is your crane capacity?
What are the clearances and space limitations?
Give us the answers, and we will give you details on the Blaw-Knox Bucket most efficient for the job . . . Over 100 types and sizes to choose from at Blaw-Knox—Bucket headquarters.
Shown is No. 671 two line Lever Arm Bucket for Digging. Capacity ¾ yd.
BLAW-KNOX BUCKETS
BLAW-KNOX DIVISION of BLAW-KNOX COMPANY
2074 FARMERS BANK BUILDING, PITTSBURGH 22, PA.

Below: Penstock trench being dug by Sauerman scraper on Caterpillar D-8 rigging tractor.

Job Engineer's Diary

(Continued from page 481)

material has been placed on access roads which are now complete and in good shape, allowing all equipment to proceed without trouble to important operations on the surge tank hill. The entire project now has important activities on at least 20 different locations. I have a busy time getting around to them each day.

March 8—The peak of our labor requirements has been reached, having had over 1500 persons employed on all activities. Production forces accounted for 75%, which when added to the 10% maintenance and service crews, and about 5% supervision, leaves only 10% "overhead" for other important duties such as clerical, camp operations, plant and equipment, and engineering. The latter is now running about 1.2% of the entire job payroll.

March 15—Safety precautions are becoming increasingly important. The frequency rate has been severe on the new operations opening up, and man-hour exposure will continue high through the calendar year. A first class dispensary is in operation and safety inspection is being given full support by top supervision and down to first line foremen. Bulletin "score boards" are placed at central locations and those responsible for accidents have their names posted. There is a lively (and usually constructive) argument concerning the reasons why some names appear. Note: An accompanying chart on this page shows the job history in this respect and a marked improvement over operations to date.

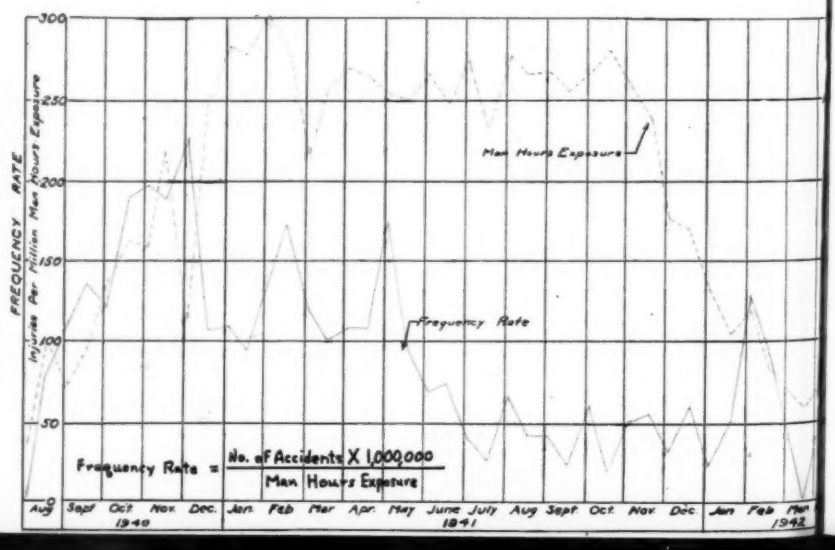
March 22 — Penstock power house and tailrace excavation continue with a variety of ideas and methods which are adapted to the equipment available and the conditions of approach. The sluicing gun from the dam was considered for steep penstock stripping. However, a bulldozer worked its way most successfully from the top, being supported by anchor cables. Trench excavation on the same hillside was effectively done with a rigging tractor and a Sauerman drag bucket.

March 31 — The first "coyote hole" was shot in the quarry after about one month of preparation. Dam fill loading, hauling and other methods of completion now include dragline casting of loose rock at the river edge, bulldozing excavated seal trench rock, direct haul in Euclid trucks from preliminary quarry shots, some fill from tunnel muck storage, and overcasting from the quarry floor. Over 220,000 cu. yds. have been so placed. Plans are now being charted for a completely systematic approach to long range yardage requirements.

WILL BE CONTINUED IN FUTURE ISSUES

The Utah Construction Co. Nantahala Project

FREQUENCY RATE—LOST TIME INJURIES FOR PERIODS SHOWN



TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

½ yd. dragline; 1 yd. Northwest No. 4 shovel dragline; 2 yd. Bucyrus-Erie dragline. Box 3172

¾ yd. Northwest Model 25, almost new. Box 3173

One Osgood steam shovel No. 1212 on caterpillar treads. ¾ yard, heavy duty, in fair condition.
The Permutit Co., Birmingham, N. J.

Used Marion Model 350 electric shovel reasonably priced, central location with stock of spare parts. Box 3167

Five Caterpillar DW10 tractor La Plante-Choate scraper combination units. Write Colorado Constructors, Inc., 725 West 39th Ave., Denver 16, Colorado.

Complete rock plant 60 tons per hour. Almost all new diesel equipment. Box 3168

One 45 ft. boom practically new, for Marion Model 125 shovel. Box 3161

Six booster clutch springs for Bucyrus-Erie 16-B. Rhoades Construction Co., Newton, Kansas.

Dragline buckets: 1 yd.; 1½ yd.; 1¾ yd. Box 3170

For Sale

3 Coleman dump trucks, 7½ yd. bodies—5 ton chassis. Excellent condition, perfect tires and spares. Many parts.

Magajupa Mining Company
220 West Third—Phone 3177
Joplin, Missouri

2—New Bucyrus-Erie Model 15B ½ yd. shovel dippers.
2—New Bucyrus-Erie Model 15B ½ yd. backhoe dippers, side cutting teeth. Box 3165

LOCOMOTIVES—2-5 ton type CS 4 Whitcomb gasoline locomotives. Serial numbers 12953 and 12954. Thirty inch gauge. Good operating condition. $750 each loaded on cars.
MINE CARS—36-2 ton mine cars. Thirty inch gauge, twenty inch wheelbase. Timken roller bearing wheels. Wood construction steel reinforced. End dump over rocker. Fairly good condition. $75 each loaded on cars.
EASTERN CLAY PRODUCTS, INC.
Elfort, Ohio

Liquidation Sale at Falling Spring, Va.
(Located near Covington, Va.)

1—8 ton PLYMOUTH LOCOMOTIVE MODEL D.L.L. with Climax gasoline motor 42" gauge.
14—EASTON & ATLAS ROCKER DUMP CARS, 78 cable feet capacity 42" gauge.
3—KOPPEL DUMP CARS 4 yd. capacity with brakes 42" gauge.
1—OSGOOD STEAM SHOVEL, 1 yd. bucket Model 29 on caterpillar tractor.
1—BONNOT HAMMERMILL 30" x 36" Serial No. 40 belt driven by 75 H.P., G.E. slipring motor 3 ph 60 cycle 220 V 360 R.P.M. 186 Hmp Type I.
1—JEFFREY PULVERIZER 36"x24" Type 3 Serial 1899, Belt Driven by 100 H.P. Westinghouse slipring motor 3 ph 60 cycle 2200 V 700 R.P.M.
1—GYRATORY CRUSHER AUSTIN MFG. Co. No. 7½ shop No. 3093 driven by 75 H.P., G.E. slipring motor 3 ph 60 cycle 2200V 800 RPM.
1—ROTARY KILN 8' x 75'.
1—LINK BELT continuous single strand bucket elevator No. 730 chain, buckets —12" x 10", steel support 55' between centers.
1—LINK BELT continuous single strand bucket elevator bucket 12" x 10" about 75' between centers.
1—18" BELT CONVEYOR about 100' between centers.
1—WESTINGHOUSE A. C. GENERATOR 500 K.V.A. 2400 V 120, 5 Amps per terminal 3 ph 60 cycle 600 R.P.M. Serial No. 1231045.
Driven by a Pelton waterwheel with type P Pelton connected to Westinghouse DC generator (exciter) No. 80 L Type S.K. 13.5 KW 135 V 100 Amps 1050 R.P.M.
1—WESTINGHOUSE D.C. generator (convertor) N-750 Type S.K. 60 K.W. 550 V 91 Amps 1140 R.P.M. Serial No. 1321161 Driven by Westinghouse induction motor 75 H.P. 2200 V 19.08 Amps 3 ph 60 cycle 1140 R.P.M. Serial No. 1321045.

Hugo Neu, 31 Nassau St., New York 5, N. Y.
Phone Rector 2-1334

Rope crowd shovel attachment for Bucyrus-Erie 1020 machine. Boom 20', dipper handle 13', ½-yd. plate front dipper. Priced for immediate sale. Box 3164

For Sale —

SHASTA DAM SAND AND GRAVEL PLANT AND 10-MILE CONVEYOR EQUIPMENT

Including:
6000—36" AND 42" IDLERS.
Pulleys and Drives.
LATE MODEL 200 HP., 1800 R.P.M. GE MOTORS, complete with Starting Equipment.
Western Gear Reducers, 200 HP., 40 to 1 Ratio.
8 x 12 MARCY ROD MILL.
Dorr Hydroseparator.
30" Tripper and Trestle.
Merrick Weightometer.
All Types of Pumps, complete with Drives.
42" Pendulum Boom Conveyors, 100' and 200'.
Electric Line Equipment, Transformers, Motors and Supplies.
Other Miscellaneous Contractors' Equipment.

Subject to Prior Sale

Write, Wire or Telephone Redding 1440

COLUMBIA CONSTRUCTION CO., INC.
Box 579 Redding, California

Surplus Hydraulic Press Stock Available For Immediate Shipment.

4 Beco Portable Hydraulic Presses—100 tons capacity consisting of: Press cylinder (ram), 4 speed pump with high pressure globe valve, 5' 0" high pressure hose, 5' 0" oil return hose.
3 100 ton Press Frames, including:
1 Frame head
1 Cylinder back plate
4 Alloy steel back plate rods, 1"x20" with 8 nuts
1 Frame base with tie rods and nuts
4 Alloy steel frame rods 1"x48" with nuts
2 Extension sets, consisting of:
4 Sprocket lugs
4 Rod connectors
4 Extension rods, 24" with nuts
4 Extension rods, 38" with nuts
4 Extension rods, 48" alloy steel, with nuts.
1 Frame for track repair work consisting of:
1 Special back plate
3 Rods with nuts to attach press cylinder to track press frame
2 pcs. 10' 0" High pressure hose with fittings for 100 ton Press.
9 Pressure gauges

Bucyrus-Erie Company
South Milwaukee, Wisconsin

For Sale: Following equipment all located at Zap, North Dakota. May be inspected at any time.
3 Vulcan steam locomotives, 18 ton, 42" gauge.
2 Davenport steam locomotives, 21 ton, 42" gauge.
1 Whitcomb gas locomotive, 14 ton, 42" gauge.
10 18 ton roller bearing steel bottom dump hopper cars, 42" gauge.
1 Bucyrus-Erie GA2 shovel 1¼ yard coal bucket.
1 International TK40 gas caterpillar tractor.
1 1½ yard manganese lip ore shovel bucket.
1 1¼ yard manganese lip ore shovel bucket.
1 3 yard Daniels Murtaugh dragline rock bucket.
1 Atlas Imperial 65 h.p. diesel engine.
1 Fairbanks Morse 20 h.p. diesel engine.
1 150 h.p. Bros steam boiler
1 Dryer, steam, 100 lbs. pressure, Capacity 20 tons material.
Approximately 325 tons railroad steel, 45 to 90 lbs.
Also large quantity angle bars, frogs, switch points, spikes, bolts, etc.
Address inquiries to:

DAKOTA COLLIERIES COMPANY
1017 Lumber Exchange
Minneapolis 1, Minnesota

New 2 & 3" self priming pumps, still in crates. Box 3171

½ YD. SHOVEL FRONT for Byers Model 60. Good condition.
Blazer-Jenkins Concrete Co.
Gallipolis, Ohio. Phone 480

SURPLUS DIPPERS FOR BUCYRUS-ERIE SHOVELS

2—⅝ cu. yd. Skimmer Scoop Dipper—10-B.
2—½ cu. yd. Drag Shovel Dipper—17-B.
3—½ cu. yd. Skimmer Scoop Dipper—17-B.
1—¾ cu. yd. Welded Dipper—21-B.
1—1¼ cu. yd. Drag Shovel Dipper—38-B.
1—1½ cu. yd. Heavy Duty All Cast Dipper 42-B.
1—1½ cu. yd. type 4 Med. Duty Dipper.
1—2 cu. yd. Rock Dipper—75-B.
1—2¼ cu. yd. Inserted Type Dipper—50-B.
1—2¼ cu. yd. Inserted Type—55-B.
1—3½ cu. yd. Coal Loading Dipper—75-B.
1—4 cu. yd. Type IV Medium Duty Dipper 100-B.
F.O.B. Works

Write for any further information desired

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

(For Sale Continued on page 528)

For Sale

(Continued from page 527)

50 ton truck scales 24' long. Box 3169

6B Smith gyratory crusher, complete with motor, starter and fuse boxes, like new. Box 3154

One complete set of 30" track links for Bucyrus-Erie 54-B shovel. Treads have had about sixty days service. Box 3155

1 Bucyrus-Erie 37-B shovel front complete with boom, dipper sticks and bucket with all parts as taken from 37-B machine 25018. Condition excellent. Box 3156

ENGINEERS AND MECHANICS step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a handy form. Fully Illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 days' Free Examination. Send No Money. Nothing to pay postman.

- ☐ Marine, $4
- ☐ Machinist, $4
- ☐ Shipfitter, $1
- ☐ Radio, $4
- ☐ Diesel, $2
- ☐ Mathematics, $2
- ☐ Sheet Metal, $1
- ☐ Blueprint, $2
- ☐ Electricity, $4
- ☐ Welders, $1
- ☐ Plumbers, $6
- ☐ Carpenters, $6
- ☐ Auto, $4
- ☐ Refrigeration, $4

If satisfied you pay only $1 a month until purchase price is paid.

AUDEL, Pub., 49 W. 23rd St., N. Y. 10, N. Y.

One 2 cubic yard heavy duty rock bucket for 50-B steam shovel. Used 2 weeks. Price $250. Located St. Paul, Minn. Box 3162

FOR RENT
HD 7 with Baker dozer or TD 40 with Gar Wood dozer. Box 3166

For Sale or Rent: Quarry in southern Lancaster County. Millions of tons above water level. W. F. Geiger, Quarryville, Pa.

EQUIPMENT WANTED

One (1) new D-7 Caterpillar tractor equipped with Angledozer and LeTourneau cable control. C. Martinique, General Delivery, Chicago Heights, Illinois.

New Trade Literature

(Continued from page 525)

under the brand names of Monarch, Ajax and Conservo. Maintenance suggestions advise users how to prolong the life of belts and avoid production delays.

Where to Get: Hewitt-Robins Inc., Buffalo, N. Y. (Free)

Title: **Buda Earth Drills**

Subject: An 8-page pamphlet describing the various models of the Buda earth drills and their applications to many industries such as bridge work, foundation work, soil testing, fencing, culvert jobs, etc. On-the-job pictures are used to point out the different features of the drill types.

Where to Get: The Buda Co., Harvey, Ill. Ask for Bulletin No. 1237 (Free).

Title: **"Plylock Belt Joint"**

Subject: Illustrated step-by-step description of making rubber belts endless by the Plylock method. Seven advantages of Plylock are listed, with reasons and data supporting each claim.

Where to Get: B. F. Goodrich Company, Akron, Ohio. (Free)

Notes from the manufacturers

Beckwith Machinery Company, Pittsburgh, Pa., has been appointed distributor for the Broderick and Bascom Wire Rope Company and Gledhill Road Equipment in the territory to be served by its Pittsburgh, Harrisburg, Wilkes-Barre and Bradford branches. Both accounts are natural ones for Beckwith which services the general contracting, road building, mining, logging, drilling and quarrying industries.

Personnel changes announced by the company have Herbert Zukauskas appointed as Public Relations and Advertising Manager, and Kenneth F. Kichman named district manager of the Harrisburg office.

Milwaukee Hydraulic Corp., Milwaukee, Wis., reveals that Don Smith has assumed the position of vice president and director of sales in its organization. Smith, formerly Sales Manager of the General Excavator Co., Marion, Ohio, has been associated with the excavating industry for 20 years in various capacities.

The Quality Line!

WELLMAN

Williams Type **BUCKETS**

• You get longer service with less maintenance when you use Wellman Williams buckets because this quality line pioneered the field in welded construction of high-grade rolled steel. *Wellman-built means better-built!*

SEND FOR BULLETIN

THE WELLMAN ENGINEERING CO.
7002 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

AMERICAN CABLE SLINGS

are ACCO Registered

American Cable proof-tests every Registered sling to twice its safe-working load, before it leaves the mill. You then receive a Certificate of Test and Registry for known, predetermined strength and safety. Every sling, so registered, is identified by a metal registry tag which states maximum safe load, date of testing, and registration number. This is the biggest advance ever made toward proper wire rope sling application and working safety. Specify American Cable's ACCO-Registered slings—made of TRU-LAY Preformed Wire Rope of Improved Plow Steel.

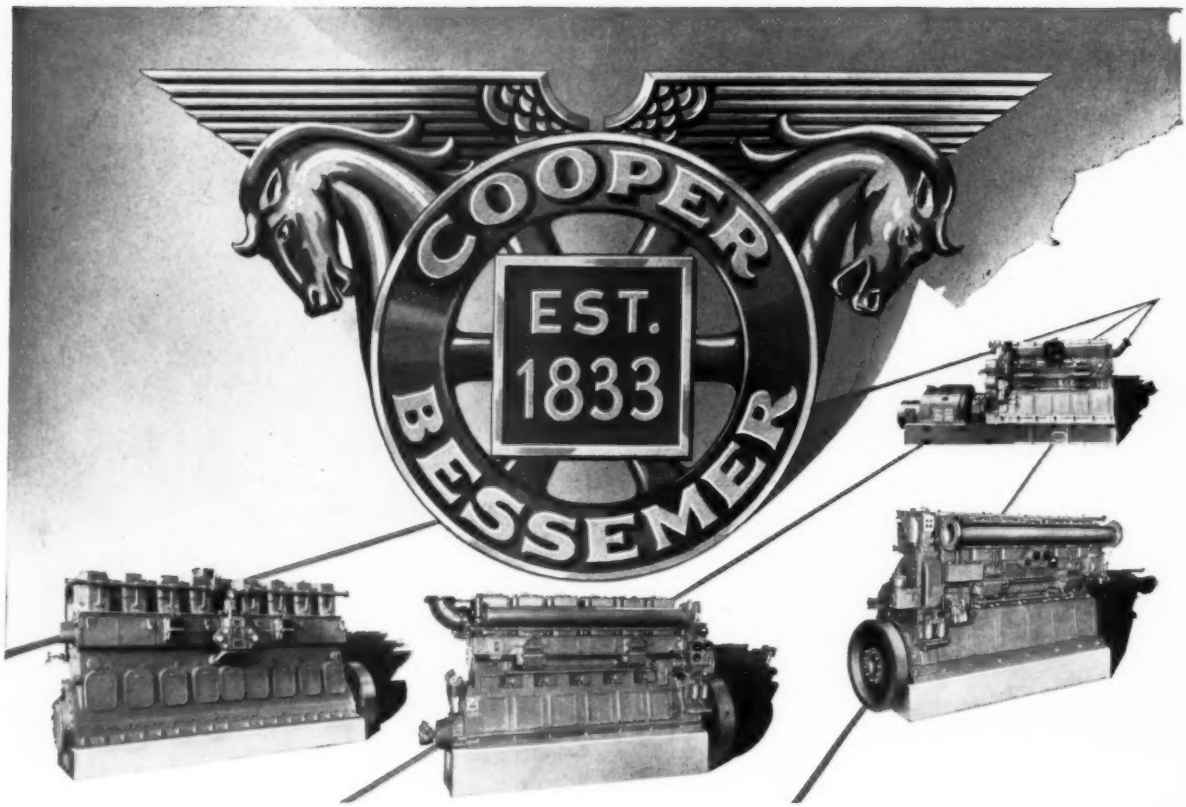
ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Emlenton, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety



Sign of Diesel Performance at its Best

THE emblem you see above appears on every Cooper-Bessemer Diesel, symbolizing 113 years of fine engine building. It has present and future significance as well. It means engines today that are better than ever . . . engines tomorrow that are still better than today's. For at Cooper-Bessemer, continuous progress is a century-old habit. This habit pays off to power users . . . pays off in Diesel stamina, efficiency, and all-around performance at its very best!

Cooper-Bessemer diesels range from 100 to 2000 horsepower, supercharged and atmospheric, for all marine, locomotive and stationary services. Get in touch with the nearest Cooper-Bessemer office for specific information.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington Tulsa Dallas Seattle
St. Louis Houston Los Angeles Shreveport
Calmes Engineering Company, New Orleans, La.